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STUDY PROTOCOL

Objective: To conduct a systematic review and meta-analysis of the impact of food labeling on consumers' dietary behaviors and food reformulation.

Methods: The recommendations of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines will be followed during all stages of the design, implementation, and reporting of this meta-analysis.

DEFINITION OF INTERVENTION/EXPOSURE AND OUTCOMES

Intervention/Exposure

A. Package labeling: Systematic/universal/near-universal provision of information on nutrition value or healthfulness of food products on their packages. These include Nutrition Facts Panel, other nutrient information, health-related words/claims, and icons/symbols as long as they are implemented by official groups (government, advocacy agencies, and associations of industry), but does not include marketing efforts made by individual companies.

B. Point-of-purchase labeling: Systematic/universal/near-universal provision of information on nutrition value or healthfulness of food products at the point-of-purchase including restaurants, supermarkets, grocery stores, food retail/self-service establishments, and vending machine.

Outcomes

A. Consumer behaviors: Consumption of the labeled foods/beverages; including data on sales/purchases as a proxy for consumption.

B. Health outcomes: Adiposity (e.g., body weight, BMI, waist circumference, overweight, skin fold, obesity); metabolic risk factors (e.g., blood pressure, serum lipids and glucose, bone density); or clinical endpoints (e.g., cardiometabolic diseases, cancer, osteoporosis, dental caries, neural tubal defects).

C. Industry behaviors: Changes in manufacturer reformulations, restaurant menus, or availability of food products.

Inclusion Criteria

1. **Design:** All intervention studies (RCTs, quasi-experimental studies) and lab experiments (if actual decisions made on purchases/orders) evaluating the relationship between the above intervention/exposure and outcomes.
2. **Population:** Any (adults and children).
3. **Setting level:** Any (national, state, city, community, workplace, or school)
4. **Intervention/Exposure:** Any standardized (government, advocacy organization, etc.) package or point-of-purchase (e.g., menu) label intended to promote healthier dietary choices/behaviors by consumers.
5. **Effect Measure:** At least one estimate of the mean outcome and a measure of uncertainty for the reported mean/change, or information to compute them), so that percent of difference can be calculated using the methods in this Appendix (Calculation of the Estimate and SE of the Percent Difference for the Outcome Data Reported as Continuous Variable).

Exclusion Criteria

1. **Design:** Single time-point cross-sectional studies, ecological studies, or simulation studies (modeling).

2. **Intervention/Exposure:** Food labels that only provide information about ingredients (e.g., pinto beans, water, oil, percent juice declaration), directions, warnings (allergen), or other non-nutritional information (e.g., alcohol, wines). Labels implemented on individual products by manufacturers, rather than by an external group. Marketing efforts by individual companies. For large sized printing materials placed adjacent to food/beverage products, we excluded those with general dietary health-promoting slogans as educational posters and excluded those with non-nutritional sales-promoting information as commercial advertisement.
3. **Outcomes:** Changes in attitudes (e.g., liking, attracting, preference, or perception), awareness, knowledge, or hypothetical dietary intakes/purchases.
4. **Type of Articles:** Commentaries, general reviews, duplicate publications from the same study without providing new information. Commentaries and reviews will be included in the initial screening and full-text review as a source of references. Duplicate publications from the same study will also be included in the initial screening for further assessment of the full-text.
5. **Publication date:** Prior to 1990, to maximize generalizability to contemporary food labeling approaches and consumer and industry behaviors.

SEARCH QUERY FOR PUBMED

Setting Query

("schools"[MeSH] OR schools[tiab] OR "university"[tiab] OR "universities"[tiab] OR "workplace"[MeSH] OR workplace[tiab] OR "worksite"[tiab] OR "worksites"[tiab] OR "office"[tiab] OR grocery[tiab] OR groceries[tiab] OR store[tiab] OR stores[tiab] OR supermarket[tiab] OR supermarkets[tiab] OR retailer[tiab] OR retailers[tiab] OR market[tiab] OR markets[tiab] OR cafeteria[tiab] OR cafeterias[tiab] OR cafe[tiab] OR cafes[tiab] OR restaurant[tiab] OR restaurants[tiab] OR "restaurants"[MeSH] OR "canteen"[tiab] OR "food outlet"[tiab] OR "food outlets"[tiab] OR bakery[tiab] OR bakeries[tiab] OR "fast food chain"[tiab] OR "fast food chains"[tiab] OR "food establishments"[tiab] OR "food services"[MeSH] OR "food industry"[MeSH] OR "self-service facilities"[tiab] OR "food dispensers, automatic"[MeSH] OR "vending"[tiab] OR "point-of-purchase"[tiab] OR "point-of-selection"[tiab] OR menu[tiab] OR menus[tiab] OR package[tiab] OR packages[tiab] OR "front-of-pack"[tiab] OR "product packaging"[MeSH] OR "on-shelf"[tiab] OR "in-store"[tiab])

Intervention Query

("food labeling"[MeSH] OR "food labeling"[tiab] OR "food labelling"[tiab] OR "food labels"[tiab] OR "food label"[tiab] OR "menu labeling"[tiab] OR "menu labelling"[tiab] OR "nutrition labeling"[tiab] OR "nutrition labelling"[tiab] OR "nutrition label"[tiab] OR "nutrition labels"[tiab] OR "nutritional labels"[tiab] OR "nutritional labeling"[tiab] OR "nutrition information"[tiab] OR "nutrition logo"[tiab] OR "calorie information"[tiab] OR "calorie labeling"[tiab] OR "calorie labelling"[tiab] OR "fat content information"[tiab] OR "low-fat label"[tiab] OR "product information"[tiab] OR "product labeling"[MeSH] OR "product labeling"[tiab] OR "product labelling"[tiab] OR "product label"[tiab] OR "product labels"[tiab] OR "nutrition facts panel"[tiab] OR "color codes"[tiab] OR "traffic light"[tiab] OR "traffic lights"[tiab] OR "heart-check"[tiab] OR "health claims"[tiab] OR "health implication"[tiab])

Outcome Query

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NOT Terms

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Appendix
A Meta-analysis of Food Labeling Effects on Consumer Diet Behaviors and Industry Practices
Shangguan et al.

Limits

Age: any

Setting: any

Year range: 1990+

Language: any

Abstracts identified: 2,301

SEARCH QUERY FOR EMBASE

Setting Query

(schools OR university OR universities OR workplace OR worksite OR worksites OR office OR grocery OR groceries OR store OR stores OR supermarket OR supermarkets OR retailer OR retailers OR market OR markets OR cafeteria OR cafeterias OR café OR cafes OR restaurant OR restaurants OR canteen OR 'food outlet' OR 'food outlets' OR bakery OR bakeries OR 'fast food chain' OR 'fast food chains' OR 'food establishments' OR 'food services' OR 'food industry' OR 'self-service facilities' OR 'food dispensers' OR vending OR 'point-of-purchase' OR 'point-of-selection' OR menu OR menus OR package OR packages OR 'front-of-pack' OR 'product packaging' OR 'on-shelf' OR 'in-store')

Intervention Query

('food labeling' OR 'food labelling' OR 'food labels' OR 'food label' OR 'menu labeling' OR 'menu labelling' OR 'nutrition labeling' OR 'nutrition labelling' OR 'nutrition label' OR 'nutrition labels' OR 'nutritional labels' OR 'nutritional labeling' OR 'nutrition information' OR 'nutrition logo' OR 'calorie information' OR 'calorie labeling' OR 'calorie labelling' OR 'fat content information' OR 'low-fat label' OR 'product information' OR 'product labeling' OR 'product labelling' OR 'product label' OR 'product labels' OR 'nutrition facts panel' OR 'color codes' OR 'traffic light' OR 'traffic lights' OR 'heart-check' OR 'health claims' OR 'health implication')

Outcome Query

('health behavior' OR 'feeding behavior' OR 'dietary change' OR 'life style' OR 'food analysis' OR 'diet surveys' OR eating OR intake OR consumption OR 'food habits' OR 'food choices' OR 'food choice' OR 'food purchasing' OR 'dietary behavior' OR purchase OR sale OR sales OR diet OR food OR foods OR beverages OR beverage OR drinks OR soda OR 'carbonated water' OR juice OR 'sugar sweetened' OR 'SSB' OR milk OR dairy OR fruit OR vegetables OR candy OR snacks OR 'junk food' OR 'fast foods' OR 'preserved food' OR 'fortified food' OR nutrient OR nutrients OR 'nutritive value' OR nutrition OR calorie OR calories OR calorimetry OR energy OR 'dietary fats' OR 'fatty acids' OR 'trans fat' OR 'trans fats' OR 'saturated fat' OR 'saturated fats' OR 'unsaturated fat' OR 'unsaturated fats' OR 'omega-3' OR 'omega-6' OR 'total fat' OR 'total fats' OR cholesterol OR sodium OR salt OR salts OR potassium OR fiber OR fibers OR protein OR proteins OR 'soybean proteins' OR 'soy foods' OR carbohydrate OR carbohydrates OR sugar OR sugars OR vitamin OR vitamins OR 'folic acids' OR 'folic acid' OR folate OR minerals OR calcium OR iron OR zinc OR iodine OR iodides OR antioxidants OR fluoridated OR micronutrients OR 'cardiovascular risk' OR anthropometry OR obesity OR obese OR overweight OR 'body composition' OR 'BMI' OR 'body mass index' OR 'body fat' OR 'fat free mass' OR 'body weight' OR 'waist circumference' OR 'hip circumference' OR skinfold OR adiposity OR lipid OR lipids OR 'HDL' OR 'LDL' OR triglyceride OR triglycerides OR glucose OR 'blood pressure' OR 'BP' OR 'bone density' OR 'bone density' OR 'cardiovascular disease' OR 'cardiovascular diseases' OR hyperlipidemias OR hyperlipidemia OR dyslipidemias OR dyslipidemia OR 'glucose intolerance' OR 'insulin resistance' OR 'diabetes mellitus' OR diabetes OR hypertension OR stroke OR 'coronary disease' OR 'coronary artery disease' OR 'coronary artery disease' OR 'coronary heart disease' OR angina OR 'ischemic attack' OR ischemia OR ischaemia OR infarction OR 'heart failure' OR atherosclerosis OR 'peripheral arterial disease' OR osteoporosis OR osteopenia OR caries OR 'neural tube defects' OR cancer OR cancers OR neoplasms OR 'non-communicable diseases' OR reformulate OR reformulation)

NOT Terms

(oxygen OR O2 OR soil OR fishery OR cytokine OR cytokines OR isotope OR isotopic OR physiology OR bacteria OR microbiology OR microbe OR genome OR genomic OR genes OR DNA OR genetically OR recombinant OR HIV OR plants OR pharmacy OR pharmaceutical OR 'drug labels' OR medication OR cytometry OR molecular OR molecules OR cellular OR ligands OR receptor OR biomarker OR proteomics OR 'open-label' OR prescription OR safety OR allergen OR allergens OR allergy OR immunoassay OR 'signal transduction' OR radiological OR testosterone OR smoking OR tobacco OR cigarette OR 'bath salts' OR vaccine)

All Queries

(schools OR university OR universities OR workplace OR worksite OR worksites OR office OR grocery OR groceries OR store OR stores OR supermarket OR supermarkets OR retailer OR retailers OR market OR markets OR cafeteria OR cafeterias OR café OR cafes OR restaurant OR restaurants OR canteen OR 'food outlet' OR 'food outlets' OR bakery OR bakeries OR 'fast food chain' OR 'fast food chains' OR 'food establishments' OR 'food services' OR 'food industry' OR 'self-service facilities' OR 'food dispensers' OR vending OR 'point-of-purchase' OR 'point-of-selection' OR menu OR menus OR package OR packages OR 'front-of-pack' OR 'product packaging' OR 'on-shelf' OR 'in-store') AND ('food labeling' OR 'food labelling' OR 'food labels' OR 'food label' OR 'menu labeling' OR 'menu labelling' OR 'nutrition labeling' OR 'nutrition labelling' OR 'nutrition label' OR 'nutrition labels' OR 'nutritional labels' OR 'nutritional labeling' OR 'nutrition information' OR 'nutrition logo' OR 'calorie information' OR 'calorie labeling' OR 'calorie labelling' OR 'fat content information' OR 'low-fat label' OR 'product information' OR 'product labeling' OR 'product labelling' OR 'product label' OR 'product labels' OR 'nutrition facts panel' OR 'color codes' OR 'traffic light' OR 'traffic lights' OR 'heart-check' OR 'health claims' OR 'health implication') AND ('health behavior' OR 'feeding behavior' OR 'dietary change' OR 'life style' OR 'food analysis' OR 'diet surveys' OR eating OR intake OR consumption OR 'food habits' OR 'food choices' OR 'food choice' OR 'food purchasing' OR 'dietary behavior' OR purchase OR sale OR sales OR diet OR food OR foods OR beverages OR beverage OR drinks OR soda OR 'carbonated water' OR juice OR 'sugar sweetened' OR 'SSB' OR milk OR dairy OR fruit OR vegetables OR candy OR snacks OR 'junk food' OR 'fast foods' OR 'preserved food' OR 'fortified food' OR nutrient OR nutrients OR 'nutritive value' OR nutrition OR calorie OR calories OR calorimetry OR energy OR 'dietary fats' OR 'fatty acids' OR 'trans fat' OR 'trans fats' OR 'saturated fat' OR 'saturated fats' OR 'unsaturated fat' OR 'unsaturated fats' OR 'omega-3' OR 'omega-6' OR 'total fat' OR 'total fats' OR cholesterol OR sodium OR salt OR salts OR potassium OR fiber OR fibers OR protein OR proteins OR 'soybean proteins' OR 'soy foods' OR carbohydrate OR carbohydrates OR sugar OR sugars OR vitamin OR vitamins OR 'folic acids' OR 'folic acid' OR folate OR minerals OR calcium OR iron OR zinc OR iodine OR iodides OR antioxidants OR fluoridated OR micronutrients OR 'cardiovascular risk' OR anthropometry OR obesity OR obese OR overweight OR 'body composition' OR 'BMI' OR 'body mass index' OR 'body fat' OR 'fat free mass' OR 'body weight' OR 'waist circumference' OR 'hip circumference' OR skinfold OR adiposity OR lipid OR lipids OR 'HDL' OR 'LDL' OR triglyceride OR triglycerides OR glucose OR 'blood pressure' OR 'BP' OR 'bone density' OR 'bone density' OR 'cardiovascular disease' OR 'cardiovascular diseases' OR hyperlipidemias OR hyperlipidemia OR dyslipidemias OR dyslipidemia OR 'glucose intolerance' OR 'insulin resistance' OR 'diabetes mellitus' OR diabetes OR hypertension OR stroke OR 'coronary disease' OR 'coronary artery disease' OR

‘coronary artery disease’ OR ‘coronary heart disease’ OR angina OR ‘ischemic attack’ OR ischemia OR ischaemia OR infarction OR ‘heart failure’ OR atherosclerosis OR ‘peripheral arterial disease’ OR osteoporosis OR osteopenia OR caries OR ‘neural tube defects’ OR cancer OR cancers OR neoplasms OR ‘non-communicable diseases’ OR reformulate OR reformulation) NOT (oxygen OR O2 OR soil OR fishery OR cytokine OR cytokines OR isotope OR isotopic OR physiology OR bacteria OR microbiology OR microbe OR genome OR genomic OR genes OR DNA OR genetically OR recombinant OR HIV OR plants OR pharmacy OR pharmaceutical OR ‘drug labels’ OR medication OR cytometry OR molecular OR molecules OR cellular OR ligands OR receptor OR biomarker OR proteomics OR ‘open-label’ OR prescription OR safety OR allergen OR allergens OR allergy OR immunoassay OR ‘signal transduction’ OR radiological OR testosterone OR smoking OR tobacco OR cigarette OR ‘bath salts’ OR vaccine) AND [embase]/lim AND [1990-2014]/py

Limits

Age: Any

Setting: Any country

Year Range: 1990

Language: Any

Abstracts identified: 1,681

SEARCH QUERY FOR CABI

Setting Query

TS=(schools OR university OR universities OR workplace OR worksite OR worksites OR office OR grocery OR groceries OR store OR stores OR supermarket OR supermarkets OR retailer OR retailers OR market OR markets OR cafeteria OR cafeterias OR café OR cafes OR restaurant OR restaurants OR canteen OR “food outlet” OR “food outlets” OR bakery OR bakeries OR “fast food chain” OR “fast food chains” OR “food establishments” OR “food services” OR “food industry” OR “self-service facilities” OR “food dispensers” OR vending OR “point-of-purchase” OR “point-of-selection” OR menu OR menus OR package OR packages OR “front-of-pack” OR “product packaging” OR “on-shelf” OR “in-store”)

Intervention Query

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Outcome Query

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OR osteoporosis OR osteopenia OR caries OR “neural tube defects” OR cancer OR cancers OR neoplasms OR “non-communicable diseases” OR reformulate OR reformulation)

NOT Terms

TS=(oxygen OR O2 OR soil OR fishery OR cytokine OR cytokines OR isotope OR isotopic OR physiology OR bacteria OR microbiology OR microbe OR genome OR genomic OR genes OR DNA OR genetically OR recombinant OR HIV OR plants OR pharmacy OR pharmaceutical OR “drug labels” OR medication OR cytometry OR molecular OR molecules OR cellular OR ligands OR receptor OR biomarker OR proteomics OR “open-label” OR prescription OR safety OR allergen OR allergens OR allergy OR immunoassay OR “signal transduction” OR radiological OR testosterone OR smoking OR tobacco OR cigarette OR “bath salts” OR vaccine)

All Queries

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“cardiovascular diseases” OR hyperlipidemias OR hyperlipidemia OR dyslipidemias OR dyslipidemia OR “glucose intolerance” OR “insulin resistance” OR “diabetes mellitus” OR diabetes OR hypertension OR stroke OR “coronary disease” OR “coronary artery disease” OR “coronary artery disease” OR “coronary heart disease” OR angina OR “ischemic attack” OR ischemia OR ischaemia OR infarction OR “heart failure” OR atherosclerosis OR “peripheral arterial disease” OR osteoporosis OR osteopenia OR caries OR “neural tube defects” OR cancer OR cancers OR neoplasms OR “non-communicable diseases” OR reformulate OR reformulation) **NOT** TS=(oxygen OR O2 OR soil OR fishery OR cytokine OR cytokines OR isotope OR isotopic OR physiology OR bacteria OR microbiology OR microbe OR genome OR genomic OR genes OR DNA OR genetically OR recombinant OR HIV OR plants OR pharmacy OR pharmaceutical OR “drug labels” OR medication OR cytometry OR molecular OR molecules OR cellular OR ligands OR receptor OR biomarker OR proteomics OR “open-label” OR prescription OR safety OR allergen OR allergens OR allergy OR immunoassay OR “signal transduction” OR radiological OR testosterone OR smoking OR tobacco OR cigarette OR “bath salts” OR vaccine)

Limits

Age: Any

Setting: Any country

Year Range: 1990

Language: Any

Abstracts identified: 1,294

SEARCH QUERY FOR WEB OF SCIENCE

Setting Query

TS=(schools OR university OR universities OR workplace OR worksite OR worksites OR office OR grocery OR groceries OR store OR stores OR supermarket OR supermarkets OR retailer OR retailers OR market OR markets OR cafeteria OR cafeterias OR café OR cafes OR restaurant OR restaurants OR canteen OR “food outlet” OR “food outlets” OR bakery OR bakeries OR “fast food chain” OR “fast food chains” OR “food establishments” OR “food services” OR “food industry” OR “self-service facilities” OR “food dispensers” OR vending OR “point-of-purchase” OR “point-of-selection” OR menu OR menus OR package OR packages OR “front-of-pack” OR “product packaging” OR “on-shelf” OR “in-store”)

Intervention Query

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Outcome Query

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OR osteoporosis OR osteopenia OR caries OR “neural tube defects” OR cancer OR cancers OR neoplasms OR “non-communicable diseases” OR reformulate OR reformulation)

NOT Terms

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All Queries

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Limits

Age: Any

Setting: Any country

Year Range: 1990

Language: Any

Abstracts identified: 1,211

SEARCH QUERY FOR CINAHL

Setting Query

AB (schools OR university OR universities OR workplace OR worksite OR worksites OR office OR grocery OR groceries OR store OR stores OR supermarket OR supermarkets OR retailer OR retailers OR market OR markets OR cafeteria OR cafeterias OR café OR cafes OR restaurant OR restaurants OR canteen OR “food outlet” OR “food outlets” OR bakery OR bakeries OR “fast food chain” OR “fast food chains” OR “food establishments” OR “food services” OR “food industry” OR “self-service facilities” OR “food dispensers” OR vending OR “point-of-purchase” OR “point-of-selection” OR menu OR menus OR package OR packages OR “front-of-pack” OR “product packaging” OR “on-shelf” OR “in-store”)

Intervention Query

AB (“food labeling” OR “food labelling” OR “food labels” OR “food label” OR “menu labeling” OR “menu labelling” OR “nutrition labeling” OR “nutrition labelling” OR “nutrition label” OR “nutrition labels” OR “nutritional labels” OR “nutritional labeling” OR “nutrition information” OR “nutrition logo” OR “calorie information” OR “calorie labeling” OR “calorie labelling” OR “fat content information” OR “low-fat label” OR “product information” OR “product labeling” OR “product labelling” OR “product label” OR “product labels” OR “nutrition facts panel” OR “color codes” OR “traffic light” OR “traffic lights” OR “heart-check” OR “health claims” OR “health implication”)

Outcome Query

AB (“health behavior” OR “feeding behavior” OR “dietary change” OR “life style” OR “food analysis” OR “diet surveys” OR eating OR intake OR consumption OR “food habits” OR “food choices” OR “food choice” OR “food purchasing” OR “dietary behavior” OR purchase OR sale OR sales OR diet OR food OR foods OR beverages OR beverage OR drinks OR soda OR “carbonated water” OR juice OR “sugar sweetened” OR “SSB” OR milk OR dairy OR fruit OR vegetables OR candy OR snacks OR “junk food” OR “fast foods” OR “preserved food” OR “fortified food” OR nutrient OR nutrients OR “nutritive value” OR nutrition OR calorie OR calories OR calorimetry OR energy OR “dietary fats” OR “fatty acids” OR “trans fat” OR “trans fats” OR “saturated fat” OR “saturated fats” OR “unsaturated fat” OR “unsaturated fats” OR “omega-3” OR “omega-6” OR “total fat” OR “total fats” OR cholesterol OR sodium OR salt OR salts OR potassium OR fiber OR fibers OR protein OR proteins OR “soybean proteins” OR “soy foods” OR carbohydrate OR carbohydrates OR sugar OR sugars OR vitamin OR vitamins OR “folic acids” OR “folic acid” OR folate OR minerals OR calcium OR iron OR zinc OR iodine OR iodides OR antioxidants OR fluoridated OR micronutrients OR “cardiovascular risk” OR anthropometry OR obesity OR obese OR overweight OR “body composition” OR “BMI” OR “body mass index” OR “body fat” OR “fat free mass” OR “body weight” OR “waist circumference” OR “hip circumference” OR skinfold OR adiposity OR lipid OR lipids OR “HDL” OR “LDL” OR triglyceride OR triglycerides OR glucose OR “blood pressure” OR “BP” OR “bone density” OR “bone density” OR “cardiovascular disease” OR “cardiovascular diseases” OR hyperlipidemias OR hyperlipidemia OR dyslipidemias OR dyslipidemia OR “glucose intolerance” OR “insulin resistance” OR “diabetes mellitus” OR diabetes OR hypertension OR stroke OR “coronary disease” OR “coronary artery disease” OR “coronary artery disease” OR “coronary heart disease” OR angina OR “ischemic attack” OR ischemia OR ischaemia OR infarction OR “heart failure” OR atherosclerosis OR “peripheral arterial disease”)

OR osteoporosis OR osteopenia OR caries OR “neural tube defects” OR cancer OR cancers OR neoplasms OR “non-communicable diseases” OR reformulate OR reformulation)

NOT Terms

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All Queries

AB (schools OR university OR universities OR workplace OR worksite OR worksites OR office OR grocery OR groceries OR store OR stores OR supermarket OR supermarkets OR retailer OR retailers OR market OR markets OR cafeteria OR cafeterias OR café OR cafes OR restaurant OR restaurants OR canteen OR “food outlet” OR “food outlets” OR bakery OR bakeries OR “fast food chain” OR “fast food chains” OR “food establishments” OR “food services” OR “food industry” OR “self-service facilities” OR “food dispensers” OR vending OR “point-of-purchase” OR “point-of-selection” OR menu OR menus OR package OR packages OR “front-of-pack” OR “product packaging” OR “on-shelf” OR “in-store”) AND AB (“food labeling” OR “food labelling” OR “food labels” OR “food label” OR “menu labeling” OR “menu labelling” OR “nutrition labeling” OR “nutrition labelling” OR “nutrition label” OR “nutrition labels” OR “nutritional labels” OR “nutritional labeling” OR “nutrition information” OR “nutrition logo” OR “calorie information” OR “calorie labeling” OR “calorie labelling” OR “fat content information” OR “low-fat label” OR “product information” OR “product labeling” OR “product labelling” OR “product label” OR “product labels” OR “nutrition facts panel” OR “color codes” OR “traffic light” OR “traffic lights” OR “heart-check” OR “health claims” OR “health implication”) AND AB (“health behavior” OR “feeding behavior” OR “dietary change” OR “life style” OR “food analysis” OR “diet surveys” OR eating OR intake OR consumption OR “food habits” OR “food choices” OR “food choice” OR “food purchasing” OR “dietary behavior” OR purchase OR sale OR sales OR diet OR food OR foods OR beverages OR beverage OR drinks OR soda OR “carbonated water” OR juice OR “sugar sweetened” OR “SSB” OR milk OR dairy OR fruit OR vegetables OR candy OR snacks OR “junk food” OR “fast foods” OR “preserved food” OR “fortified food” OR nutrient OR nutrients OR “nutritive value” OR nutrition OR calorie OR calories OR calorimetry OR energy OR “dietary fats” OR “fatty acids” OR “trans fat” OR “trans fats” OR “saturated fat” OR “saturated fats” OR “unsaturated fat” OR “unsaturated fats” OR “omega-3” OR “omega-6” OR “total fat” OR “total fats” OR cholesterol OR sodium OR salt OR salts OR potassium OR fiber OR fibers OR protein OR proteins OR “soybean proteins” OR “soy foods” OR carbohydrate OR carbohydrates OR sugar OR sugars OR vitamin OR vitamins OR “folic acids” OR “folic acid” OR folate OR minerals OR calcium OR iron OR zinc OR iodine OR iodides OR antioxidants OR fluoridated OR micronutrients OR “cardiovascular risk” OR anthropometry OR obesity OR obese OR overweight OR “body composition” OR “BMI” OR “body mass index” OR “body fat” OR “fat free mass” OR “body weight” OR “waist circumference” OR “hip circumference” OR skinfold OR adiposity OR lipid OR lipids OR “HDL” OR “LDL” OR triglyceride OR triglycerides OR glucose OR “blood pressure” OR “BP” OR “bone density” OR “bone density” OR “cardiovascular disease” OR

“cardiovascular diseases” OR hyperlipidemias OR hyperlipidemia OR dyslipidemias OR dyslipidemia OR “glucose intolerance” OR “insulin resistance” OR “diabetes mellitus” OR diabetes OR hypertension OR stroke OR “coronary disease” OR “coronary artery disease” OR “coronary artery disease” OR “coronary heart disease” OR angina OR “ischemic attack” OR ischemia OR ischaemia OR infarction OR “heart failure” OR atherosclerosis OR “peripheral arterial disease” OR osteoporosis OR osteopenia OR caries OR “neural tube defects” OR cancer OR cancers OR neoplasms OR “non-communicable diseases” OR reformulate OR reformulation) NOT AB (oxygen OR O2 OR soil OR fishery OR cytokine OR cytokines OR isotope OR isotopic OR physiology OR bacteria OR microbiology OR microbe OR genome OR genomic OR genes OR DNA OR genetically OR recombinant OR HIV OR plants OR pharmacy OR pharmaceutical OR “drug labels” OR medication OR cytometry OR molecular OR molecules OR cellular OR ligands OR receptor OR biomarker OR proteomics OR “open-label” OR prescription OR safety OR allergen OR allergens OR allergy OR immunoassay OR “signal transduction” OR radiological OR testosterone OR smoking OR tobacco OR cigarette OR “bath salts” OR vaccine)

Limits

Age: Any

Setting: Any country

Year Range: 1990

Language: Any

Abstracts identified: 169

SEARCH QUERY FOR ECONLIT

Setting Query

(ti(schools OR university OR universities OR workplace OR worksite OR worksites OR office OR grocery OR groceries OR store OR stores OR supermarket OR supermarkets OR retailer OR retailers OR market OR markets OR cafeteria OR cafeterias OR café OR cafes OR restaurant OR restaurants OR canteen OR “food outlet” OR “food outlets” OR bakery OR bakeries OR “fast food chain” OR “fast food chains” OR “food establishments” OR “food services” OR “food industry” OR “self-service facilities” OR “food dispensers” OR vending OR “point-of-purchase” OR “point-of-selection” OR menu OR menus OR package OR packages OR “front-of-pack” OR “product packaging” OR “on-shelf” OR “in-store”) OR ab(schools OR university OR universities OR workplace OR worksite OR worksites OR office OR grocery OR groceries OR store OR stores OR supermarket OR supermarkets OR retailer OR retailers OR market OR markets OR cafeteria OR cafeterias OR café OR cafes OR restaurant OR restaurants OR canteen OR “food outlet” OR “food outlets” OR bakery OR bakeries OR “fast food chain” OR “fast food chains” OR “food establishments” OR “food services” OR “food industry” OR “self-service facilities” OR “food dispensers” OR vending OR “point-of-purchase” OR “point-of-selection” OR menu OR menus OR package OR packages OR “front-of-pack” OR “product packaging” OR “on-shelf” OR “in-store”))

Intervention Query

(ti(“food labeling” OR “food labelling” OR “food labels” OR “food label” OR “menu labeling” OR “menu labelling” OR “nutrition labeling” OR “nutrition labelling” OR “nutrition label” OR “nutrition labels” OR “nutritional labels” OR “nutritional labeling” OR “nutrition information” OR “nutrition logo” OR “calorie information” OR “calorie labeling” OR “calorie labelling” OR “fat content information” OR “low-fat label” OR “product information” OR “product labeling” OR “product labelling” OR “product label” OR “product labels” OR “nutrition facts panel” OR “color codes” OR “traffic light” OR “traffic lights” OR “heart-check” OR “health claims” OR “health implication”) OR ab(“food labeling” OR “food labelling” OR “food labels” OR “food label” OR “menu labeling” OR “menu labelling” OR “nutrition labeling” OR “nutrition labelling” OR “nutrition label” OR “nutrition labels” OR “nutritional labels” OR “nutritional labeling” OR “nutrition information” OR “nutrition logo” OR “calorie information” OR “calorie labeling” OR “calorie labelling” OR “fat content information” OR “low-fat label” OR “product information” OR “product labeling” OR “product labelling” OR “product label” OR “product labels” OR “nutrition facts panel” OR “color codes” OR “traffic light” OR “traffic lights” OR “heart-check” OR “health claims” OR “health implication”))

Outcome Query

(ti(“health behavior” OR “feeding behavior” OR “dietary change” OR “life style” OR “food analysis” OR “diet surveys” OR eating OR intake OR consumption OR “food habits” OR “food choices” OR “food choice” OR “food purchasing” OR “dietary behavior” OR purchase OR sale OR sales OR diet OR food OR foods OR beverages OR beverage OR drinks OR soda OR “carbonated water” OR juice OR “sugar sweetened” OR “SSB” OR milk OR dairy OR fruit OR vegetables OR candy OR snacks OR “junk food” OR “fast foods” OR “preserved food” OR “fortified food” OR nutrient OR nutrients OR “nutritive value” OR nutrition OR calorie OR calories OR calorimetry OR energy OR “dietary fats” OR “fatty acids” OR “trans fat” OR “trans fats” OR “saturated fat” OR “saturated fats” OR “unsaturated fat” OR “unsaturated fats” OR “omega-3” OR “omega-6” OR “total fat” OR “total fats” OR cholesterol OR sodium OR salt OR

salts OR potassium OR fiber OR fibers OR protein OR proteins OR “soybean proteins” OR “soy foods” OR carbohydrate OR carbohydrates OR sugar OR sugars OR vitamin OR vitamins OR “folic acids” OR “folic acid” OR folate OR minerals OR calcium OR iron OR zinc OR iodine OR iodides OR antioxidants OR fluoridated OR micronutrients OR “cardiovascular risk” OR anthropometry OR obesity OR obese OR overweight OR “body composition” OR “BMI” OR “body mass index” OR “body fat” OR “fat free mass” OR “body weight” OR “waist circumference” OR “hip circumference” OR skinfold OR adiposity OR lipid OR lipids OR “HDL” OR “LDL” OR triglyceride OR triglycerides OR glucose OR “blood pressure” OR “BP” OR “bone density” OR “bone density” OR “cardiovascular disease” OR “cardiovascular diseases” OR hyperlipidemias OR hyperlipidemia OR dyslipidemias OR dyslipidemia OR “glucose intolerance” OR “insulin resistance” OR “diabetes mellitus” OR diabetes OR hypertension OR stroke OR “coronary disease” OR “coronary artery disease” OR “coronary artery disease” OR “coronary heart disease” OR angina OR “ischemic attack” OR ischemia OR ischaemia OR infarction OR “heart failure” OR atherosclerosis OR “peripheral arterial disease” OR osteoporosis OR osteopenia OR caries OR “neural tube defects” OR cancer OR cancers OR neoplasms OR “non-communicable diseases” OR reformulate OR reformulation) OR ab(“health behavior” OR “feeding behavior” OR “dietary change” OR “life style” OR “food analysis” OR “diet surveys” OR eating OR intake OR consumption OR “food habits” OR “food choices” OR “food choice” OR “food purchasing” OR “dietary behavior” OR purchase OR sale OR sales OR diet OR food OR foods OR beverages OR beverage OR drinks OR soda OR “carbonated water” OR juice OR “sugar sweetened” OR “SSB” OR milk OR dairy OR fruit OR vegetables OR candy OR snacks OR “junk food” OR “fast foods” OR “preserved food” OR “fortified food” OR nutrient OR nutrients OR “nutritive value” OR nutrition OR calorie OR calories OR calorimetry OR energy OR “dietary fats” OR “fatty acids” OR “trans fat” OR “trans fats” OR “saturated fat” OR “saturated fats” OR “unsaturated fat” OR “unsaturated fats” OR “omega-3” OR “omega-6” OR “total fat” OR “total fats” OR cholesterol OR sodium OR salt OR salts OR potassium OR fiber OR fibers OR protein OR proteins OR “soybean proteins” OR “soy foods” OR carbohydrate OR carbohydrates OR sugar OR sugars OR vitamin OR vitamins OR “folic acids” OR “folic acid” OR folate OR minerals OR calcium OR iron OR zinc OR iodine OR iodides OR antioxidants OR fluoridated OR micronutrients OR “cardiovascular risk” OR anthropometry OR obesity OR obese OR overweight OR “body composition” OR “BMI” OR “body mass index” OR “body fat” OR “fat free mass” OR “body weight” OR “waist circumference” OR “hip circumference” OR skinfold OR adiposity OR lipid OR lipids OR “HDL” OR “LDL” OR triglyceride OR triglycerides OR glucose OR “blood pressure” OR “BP” OR “bone density” OR “bone density” OR “cardiovascular disease” OR “cardiovascular diseases” OR hyperlipidemias OR hyperlipidemia OR dyslipidemias OR dyslipidemia OR “glucose intolerance” OR “insulin resistance” OR “diabetes mellitus” OR diabetes OR hypertension OR stroke OR “coronary disease” OR “coronary artery disease” OR “coronary artery disease” OR “coronary heart disease” OR angina OR “ischemic attack” OR ischemia OR ischaemia OR infarction OR “heart failure” OR atherosclerosis OR “peripheral arterial disease” OR osteoporosis OR osteopenia OR caries OR “neural tube defects” OR cancer OR cancers OR neoplasms OR “non-communicable diseases” OR reformulate OR reformulation))

NOT Terms

(ti(oxygen OR O2 OR soil OR fishery OR cytokine OR cytokines OR isotope OR isotopic OR physiology OR bacteria OR microbiology OR microbe OR genome OR genomic OR genes OR DNA OR genetically OR recombinant OR HIV OR plants OR pharmacy OR pharmaceutical OR

“drug labels” OR medication OR cytometry OR molecular OR molecules OR cellular OR ligands OR receptor OR biomarker OR proteomics OR “open-label” OR prescription OR safety OR allergen OR allergens OR allergy OR immunoassay OR “signal transduction” OR radiological OR testosterone OR smoking OR tobacco OR cigarette OR “bath salts” OR vaccine) OR ab(oxygen OR O2 OR soil OR fishery OR cytokine OR cytokines OR isotope OR isotopic OR physiology OR bacteria OR microbiology OR microbe OR genome OR genomic OR genes OR DNA OR genetically OR recombinant OR HIV OR plants OR pharmacy OR pharmaceutical OR “drug labels” OR medication OR cytometry OR molecular OR molecules OR cellular OR ligands OR receptor OR biomarker OR proteomics OR “open-label” OR prescription OR safety OR allergen OR allergens OR allergy OR immunoassay OR “signal transduction” OR radiological OR testosterone OR smoking OR tobacco OR cigarette OR “bath salts” OR vaccine))

All Queries

(ti(schools OR university OR universities OR workplace OR worksite OR worksites OR office OR grocery OR groceries OR store OR stores OR supermarket OR supermarkets OR retailer OR retailers OR market OR markets OR cafeteria OR cafeterias OR café OR cafes OR restaurant OR restaurants OR canteen OR “food outlet” OR “food outlets” OR bakery OR bakeries OR “fast food chain” OR “fast food chains” OR “food establishments” OR “food services” OR “food industry” OR “self-service facilities” OR “food dispensers” OR vending OR “point-of-purchase” OR “point-of-selection” OR menu OR menus OR package OR packages OR “front-of-pack” OR “product packaging” OR “on-shelf” OR “in-store”) OR ab(schools OR university OR universities OR workplace OR worksite OR worksites OR office OR grocery OR groceries OR store OR stores OR supermarket OR supermarkets OR retailer OR retailers OR market OR markets OR cafeteria OR cafeterias OR café OR cafes OR restaurant OR restaurants OR canteen OR “food outlet” OR “food outlets” OR bakery OR bakeries OR “fast food chain” OR “fast food chains” OR “food establishments” OR “food services” OR “food industry” OR “self-service facilities” OR “food dispensers” OR vending OR “point-of-purchase” OR “point-of-selection” OR menu OR menus OR package OR packages OR “front-of-pack” OR “product packaging” OR “on-shelf” OR “in-store”)) AND (ti(“food labeling” OR “food labelling” OR “food labels” OR “food label” OR “menu labeling” OR “menu labelling” OR “nutrition labeling” OR “nutrition labelling” OR “nutrition label” OR “nutrition labels” OR “nutritional labels” OR “nutritional labeling” OR “nutrition information” OR “nutrition logo” OR “calorie information” OR “calorie labeling” OR “calorie labelling” OR “fat content information” OR “low-fat label” OR “product information” OR “product labeling” OR “product labelling” OR “product label” OR “product labels” OR “nutrition facts panel” OR “color codes” OR “traffic light” OR “traffic lights” OR “heart-check” OR “health claims” OR “health implication”) OR ab(“food labeling” OR “food labelling” OR “food labels” OR “food label” OR “menu labeling” OR “menu labelling” OR “nutrition labeling” OR “nutrition labelling” OR “nutrition label” OR “nutrition labels” OR “nutritional labels” OR “nutritional labeling” OR “nutrition information” OR “nutrition logo” OR “calorie information” OR “calorie labeling” OR “calorie labelling” OR “fat content information” OR “low-fat label” OR “product information” OR “product labeling” OR “product labelling” OR “product label” OR “product labels” OR “nutrition facts panel” OR “color codes” OR “traffic light” OR “traffic lights” OR “heart-check” OR “health claims” OR “health implication”)) AND (ti(“health behavior” OR “feeding behavior” OR “dietary change” OR “life style” OR “food analysis” OR “diet surveys” OR eating OR intake OR consumption OR “food habits” OR “food choices” OR “food choice” OR “food purchasing” OR “dietary

behavior" OR purchase OR sale OR sales OR diet OR food OR foods OR beverages OR beverage OR drinks OR soda OR "carbonated water" OR juice OR "sugar sweetened" OR "SSB" OR milk OR dairy OR fruit OR vegetables OR candy OR snacks OR "junk food" OR "fast foods" OR "preserved food" OR "fortified food" OR nutrient OR nutrients OR "nutritive value" OR nutrition OR calorie OR calories OR calorimetry OR energy OR "dietary fats" OR "fatty acids" OR "trans fat" OR "trans fats" OR "saturated fat" OR "saturated fats" OR "unsaturated fat" OR "unsaturated fats" OR "omega-3" OR "omega-6" OR "total fat" OR "total fats" OR cholesterol OR sodium OR salt OR salts OR potassium OR fiber OR fibers OR protein OR proteins OR "soybean proteins" OR "soy foods" OR carbohydrate OR carbohydrates OR sugar OR sugars OR vitamin OR vitamins OR "folic acids" OR "folic acid" OR folate OR minerals OR calcium OR iron OR zinc OR iodine OR iodides OR antioxidants OR fluoridated OR micronutrients OR "cardiovascular risk" OR anthropometry OR obesity OR obese OR overweight OR "body composition" OR "BMI" OR "body mass index" OR "body fat" OR "fat free mass" OR "body weight" OR "waist circumference" OR "hip circumference" OR skinfold OR adiposity OR lipid OR lipids OR "HDL" OR "LDL" OR triglyceride OR triglycerides OR glucose OR "blood pressure" OR "BP" OR "bone density" OR "bone density" OR "cardiovascular disease" OR "cardiovascular diseases" OR hyperlipidemias OR hyperlipidemia OR dyslipidemias OR dyslipidemia OR "glucose intolerance" OR "insulin resistance" OR "diabetes mellitus" OR diabetes OR hypertension OR stroke OR "coronary disease" OR "coronary artery disease" OR "coronary artery disease" OR "coronary heart disease" OR angina OR "ischemic attack" OR ischemia OR ischaemia OR infarction OR "heart failure" OR atherosclerosis OR "peripheral arterial disease" OR osteoporosis OR osteopenia OR caries OR "neural tube defects" OR cancer OR cancers OR neoplasms OR "non-communicable diseases" OR reformulate OR reformulation) OR ab("health behavior" OR "feeding behavior" OR "dietary change" OR "life style" OR "food analysis" OR "diet surveys" OR eating OR intake OR consumption OR "food habits" OR "food choices" OR "food choice" OR "food purchasing" OR "dietary behavior" OR purchase OR sale OR sales OR diet OR food OR foods OR beverages OR beverage OR drinks OR soda OR "carbonated water" OR juice OR "sugar sweetened" OR "SSB" OR milk OR dairy OR fruit OR vegetables OR candy OR snacks OR "junk food" OR "fast foods" OR "preserved food" OR "fortified food" OR nutrient OR nutrients OR "nutritive value" OR nutrition OR calorie OR calories OR calorimetry OR energy OR "dietary fats" OR "fatty acids" OR "trans fat" OR "trans fats" OR "saturated fat" OR "saturated fats" OR "unsaturated fat" OR "unsaturated fats" OR "omega-3" OR "omega-6" OR "total fat" OR "total fats" OR cholesterol OR sodium OR salt OR salts OR potassium OR fiber OR fibers OR protein OR proteins OR "soybean proteins" OR "soy foods" OR carbohydrate OR carbohydrates OR sugar OR sugars OR vitamin OR vitamins OR "folic acids" OR "folic acid" OR folate OR minerals OR calcium OR iron OR zinc OR iodine OR iodides OR antioxidants OR fluoridated OR micronutrients OR "cardiovascular risk" OR anthropometry OR obesity OR obese OR overweight OR "body composition" OR "BMI" OR "body mass index" OR "body fat" OR "fat free mass" OR "body weight" OR "waist circumference" OR "hip circumference" OR skinfold OR adiposity OR lipid OR lipids OR "HDL" OR "LDL" OR triglyceride OR triglycerides OR glucose OR "blood pressure" OR "BP" OR "bone density" OR "bone density" OR "cardiovascular disease" OR "cardiovascular diseases" OR hyperlipidemias OR hyperlipidemia OR dyslipidemias OR dyslipidemia OR "glucose intolerance" OR "insulin resistance" OR "diabetes mellitus" OR diabetes OR hypertension OR stroke OR "coronary disease" OR "coronary artery disease" OR "coronary artery disease" OR "coronary heart disease" OR angina

OR “ischemic attack” OR ischemia OR ischaemia OR infarction OR “heart failure” OR atherosclerosis OR “peripheral arterial disease” OR osteoporosis OR osteopenia OR caries OR “neural tube defects” OR cancer OR cancers OR neoplasms OR “non-communicable diseases” OR reformulate OR reformulation)) NOT (ti(oxygen OR O2 OR soil OR fishery OR cytokine OR cytokines OR isotope OR isotopic OR physiology OR bacteria OR microbiology OR microbe OR genome OR genomic OR genes OR DNA OR genetically OR recombinant OR HIV OR plants OR pharmacy OR pharmaceutical OR “drug labels” OR medication OR cytometry OR molecular OR molecules OR cellular OR ligands OR receptor OR biomarker OR proteomics OR “open-label” OR prescription OR safety OR allergen OR allergens OR allergy OR immunoassay OR “signal transduction” OR radiological OR testosterone OR smoking OR tobacco OR cigarette OR “bath salts” OR vaccine) OR ab(oxygen OR O2 OR soil OR fishery OR cytokine OR cytokines OR isotope OR isotopic OR physiology OR bacteria OR microbiology OR microbe OR genome OR genomic OR genes OR DNA OR genetically OR recombinant OR HIV OR plants OR pharmacy OR pharmaceutical OR “drug labels” OR medication OR cytometry OR molecular OR molecules OR cellular OR ligands OR receptor OR biomarker OR proteomics OR “open-label” OR prescription OR safety OR allergen OR allergens OR allergy OR immunoassay OR “signal transduction” OR radiological OR testosterone OR smoking OR tobacco OR cigarette OR “bath salts” OR vaccine))

Limits

Age: Any
Setting: Any country
Year Range: 1990
Language: Any

Abstracts identified: 58

SEARCH QUERY FOR PAIS

Setting Query

(ti(schools OR university OR universities OR workplace OR worksite OR worksites OR office OR grocery OR groceries OR store OR stores OR supermarket OR supermarkets OR retailer OR retailers OR market OR markets OR cafeteria OR cafeterias OR café OR cafes OR restaurant OR restaurants OR canteen OR “food outlet” OR “food outlets” OR bakery OR bakeries OR “fast food chain” OR “fast food chains” OR “food establishments” OR “food services” OR “food industry” OR “self-service facilities” OR “food dispensers” OR vending OR “point-of-purchase” OR “point-of-selection” OR menu OR menus OR package OR packages OR “front-of-pack” OR “product packaging” OR “on-shelf” OR “in-store”) OR ab(schools OR university OR universities OR workplace OR worksite OR worksites OR office OR grocery OR groceries OR store OR stores OR supermarket OR supermarkets OR retailer OR retailers OR market OR markets OR cafeteria OR cafeterias OR café OR cafes OR restaurant OR restaurants OR canteen OR “food outlet” OR “food outlets” OR bakery OR bakeries OR “fast food chain” OR “fast food chains” OR “food establishments” OR “food services” OR “food industry” OR “self-service facilities” OR “food dispensers” OR vending OR “point-of-purchase” OR “point-of-selection” OR menu OR menus OR package OR packages OR “front-of-pack” OR “product packaging” OR “on-shelf” OR “in-store”))

Intervention Query

(ti(“food labeling” OR “food labelling” OR “food labels” OR “food label” OR “menu labeling” OR “menu labelling” OR “nutrition labeling” OR “nutrition labelling” OR “nutrition label” OR “nutrition labels” OR “nutritional labels” OR “nutritional labeling” OR “nutrition information” OR “nutrition logo” OR “calorie information” OR “calorie labeling” OR “calorie labelling” OR “fat content information” OR “low-fat label” OR “product information” OR “product labeling” OR “product labelling” OR “product label” OR “product labels” OR “nutrition facts panel” OR “color codes” OR “traffic light” OR “traffic lights” OR “heart-check” OR “health claims” OR “health implication”) OR ab(“food labeling” OR “food labelling” OR “food labels” OR “food label” OR “menu labeling” OR “menu labelling” OR “nutrition labeling” OR “nutrition labelling” OR “nutrition label” OR “nutrition labels” OR “nutritional labels” OR “nutritional labeling” OR “nutrition information” OR “nutrition logo” OR “calorie information” OR “calorie labeling” OR “calorie labelling” OR “fat content information” OR “low-fat label” OR “product information” OR “product labeling” OR “product labelling” OR “product label” OR “product labels” OR “nutrition facts panel” OR “color codes” OR “traffic light” OR “traffic lights” OR “heart-check” OR “health claims” OR “health implication”))

Outcome Query

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salts OR potassium OR fiber OR fibers OR protein OR proteins OR “soybean proteins” OR “soy foods” OR carbohydrate OR carbohydrates OR sugar OR sugars OR vitamin OR vitamins OR “folic acids” OR “folic acid” OR folate OR minerals OR calcium OR iron OR zinc OR iodine OR iodides OR antioxidants OR fluoridated OR micronutrients OR “cardiovascular risk” OR anthropometry OR obesity OR obese OR overweight OR “body composition” OR “BMI” OR “body mass index” OR “body fat” OR “fat free mass” OR “body weight” OR “waist circumference” OR “hip circumference” OR skinfold OR adiposity OR lipid OR lipids OR “HDL” OR “LDL” OR triglyceride OR triglycerides OR glucose OR “blood pressure” OR “BP” OR “bone density” OR “bone density” OR “cardiovascular disease” OR “cardiovascular diseases” OR hyperlipidemias OR hyperlipidemia OR dyslipidemias OR dyslipidemia OR “glucose intolerance” OR “insulin resistance” OR “diabetes mellitus” OR diabetes OR hypertension OR stroke OR “coronary disease” OR “coronary artery disease” OR “coronary artery disease” OR “coronary heart disease” OR angina OR “ischemic attack” OR ischemia OR ischaemia OR infarction OR “heart failure” OR atherosclerosis OR “peripheral arterial disease” OR osteoporosis OR osteopenia OR caries OR “neural tube defects” OR cancer OR cancers OR neoplasms OR “non-communicable diseases” OR reformulate OR reformulation) OR ab(“health behavior” OR “feeding behavior” OR “dietary change” OR “life style” OR “food analysis” OR “diet surveys” OR eating OR intake OR consumption OR “food habits” OR “food choices” OR “food choice” OR “food purchasing” OR “dietary behavior” OR purchase OR sale OR sales OR diet OR food OR foods OR beverages OR beverage OR drinks OR soda OR “carbonated water” OR juice OR “sugar sweetened” OR “SSB” OR milk OR dairy OR fruit OR vegetables OR candy OR snacks OR “junk food” OR “fast foods” OR “preserved food” OR “fortified food” OR nutrient OR nutrients OR “nutritive value” OR nutrition OR calorie OR calories OR calorimetry OR energy OR “dietary fats” OR “fatty acids” OR “trans fat” OR “trans fats” OR “saturated fat” OR “saturated fats” OR “unsaturated fat” OR “unsaturated fats” OR “omega-3” OR “omega-6” OR “total fat” OR “total fats” OR cholesterol OR sodium OR salt OR salts OR potassium OR fiber OR fibers OR protein OR proteins OR “soybean proteins” OR “soy foods” OR carbohydrate OR carbohydrates OR sugar OR sugars OR vitamin OR vitamins OR “folic acids” OR “folic acid” OR folate OR minerals OR calcium OR iron OR zinc OR iodine OR iodides OR antioxidants OR fluoridated OR micronutrients OR “cardiovascular risk” OR anthropometry OR obesity OR obese OR overweight OR “body composition” OR “BMI” OR “body mass index” OR “body fat” OR “fat free mass” OR “body weight” OR “waist circumference” OR “hip circumference” OR skinfold OR adiposity OR lipid OR lipids OR “HDL” OR “LDL” OR triglyceride OR triglycerides OR glucose OR “blood pressure” OR “BP” OR “bone density” OR “bone density” OR “cardiovascular disease” OR “cardiovascular diseases” OR hyperlipidemias OR hyperlipidemia OR dyslipidemias OR dyslipidemia OR “glucose intolerance” OR “insulin resistance” OR “diabetes mellitus” OR diabetes OR hypertension OR stroke OR “coronary disease” OR “coronary artery disease” OR “coronary artery disease” OR “coronary heart disease” OR angina OR “ischemic attack” OR ischemia OR ischaemia OR infarction OR “heart failure” OR atherosclerosis OR “peripheral arterial disease” OR osteoporosis OR osteopenia OR caries OR “neural tube defects” OR cancer OR cancers OR neoplasms OR “non-communicable diseases” OR reformulate OR reformulation))

NOT Terms

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“drug labels” OR medication OR cytometry OR molecular OR molecules OR cellular OR ligands OR receptor OR biomarker OR proteomics OR “open-label” OR prescription OR safety OR allergen OR allergens OR allergy OR immunoassay OR “signal transduction” OR radiological OR testosterone OR smoking OR tobacco OR cigarette OR “bath salts” OR vaccine) OR ab(oxygen OR O2 OR soil OR fishery OR cytokine OR cytokines OR isotope OR isotopic OR physiology OR bacteria OR microbiology OR microbe OR genome OR genomic OR genes OR DNA OR genetically OR recombinant OR HIV OR plants OR pharmacy OR pharmaceutical OR “drug labels” OR medication OR cytometry OR molecular OR molecules OR cellular OR ligands OR receptor OR biomarker OR proteomics OR “open-label” OR prescription OR safety OR allergen OR allergens OR allergy OR immunoassay OR “signal transduction” OR radiological OR testosterone OR smoking OR tobacco OR cigarette OR “bath salts” OR vaccine))

All Queries

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Intervention Query

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Outcome Query

AB (“health behavior” OR “feeding behavior” OR “dietary change” OR “life style” OR “food analysis” OR “diet surveys” OR eating OR intake OR consumption OR “food habits” OR “food choices” OR “food choice” OR “food purchasing” OR “dietary behavior” OR purchase OR sale OR sales OR diet OR food OR foods OR beverages OR beverage OR drinks OR soda OR “carbonated water” OR juice OR “sugar sweetened” OR “SSB” OR milk OR dairy OR fruit OR vegetables OR candy OR snacks OR “junk food” OR “fast foods” OR “preserved food” OR “fortified food” OR nutrient OR nutrients OR “nutritive value” OR nutrition OR calorie OR calories OR calorimetry OR energy OR “dietary fats” OR “fatty acids” OR “trans fat” OR “trans fats” OR “saturated fat” OR “saturated fats” OR “unsaturated fat” OR “unsaturated fats” OR “omega-3” OR “omega-6” OR “total fat” OR “total fats” OR cholesterol OR sodium OR salt OR salts OR potassium OR fiber OR fibers OR protein OR proteins OR “soybean proteins” OR “soy foods” OR carbohydrate OR carbohydrates OR sugar OR sugars OR vitamin OR vitamins OR “folic acids” OR “folic acid” OR folate OR minerals OR calcium OR iron OR zinc OR iodine OR iodides OR antioxidants OR fluoridated OR micronutrients OR “cardiovascular risk” OR anthropometry OR obesity OR obese OR overweight OR “body composition” OR “BMI” OR “body mass index” OR “body fat” OR “fat free mass” OR “body weight” OR “waist circumference” OR “hip circumference” OR skinfold OR adiposity OR lipid OR lipids OR “HDL” OR “LDL” OR triglyceride OR triglycerides OR glucose OR “blood pressure” OR “BP” OR “bone density” OR “bone density” OR “cardiovascular disease” OR “cardiovascular diseases” OR hyperlipidemias OR hyperlipidemia OR dyslipidemias OR dyslipidemia OR “glucose intolerance” OR “insulin resistance” OR “diabetes mellitus” OR diabetes OR hypertension OR stroke OR “coronary disease” OR “coronary artery disease” OR “coronary artery disease” OR “coronary heart disease” OR angina OR “ischemic attack” OR ischemia OR ischaemia OR infarction OR “heart failure” OR atherosclerosis OR “peripheral arterial disease”)

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Intervention Query

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Abstracts identified: 0 in **F1000Trials**, **F1000Research** and **F1000Posters**.

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http://search.ers.usda.gov/search/advanced?affiliate=ers&enable_highlighting=true

Searching Queries:

“Any of these words”: labeling OR labelling OR labels OR label

7 links

USDA-ERS Archives

<http://ers.usda.gov/archive.aspx#.UtR2J3H6h80>

Searching Queries:

labeling: 181 links

labelling: 31 links

labels: 180 links

label: 269 links

Limits

None

Total links identified: 668

CALCULATION OF THE ESTIMATE AND SE OF THE PERCENT DIFFERENCE FOR THE OUTCOME DATA REPORTED AS CONTINUOUS VARIABLE

For quasi-experiments without a separate comparison group, we evaluated the pre/post difference. For randomized clinical trials and quasi-experiments with a separate comparison group, we evaluated the end-study difference if only post-intervention data were available; and the difference-in-difference (end-study differences accounting for baseline) if both baseline and follow-up data were available. For pre/post studies, the variance of differences was calculated assuming a within-group correlation coefficient of 0.5, 0, or 0.9 depending on the extent of independence of the two samples (Appendix). We used the following formula to calculate SE of the percent difference for the outcome data reported as continuous variable:

$$SE\left(\frac{X_2 - X_1}{X_1}\right) = SE\left(\frac{X_2}{X_1} - 1\right) = SE\left(\frac{X_2}{X_1}\right)$$

$$SE\left(\frac{X_2}{X_1}\right) = \frac{X_2}{X_1} \sqrt{\left[\frac{SE(X_1)^2}{X_1^2} + \frac{SE(X_2)^2}{X_2^2} - 2 \times \rho_{X_1, X_2} \times \frac{SE(X_1)}{X_1} \times \frac{SE(X_2)}{X_2} \right]}$$

Outcome results (X1, X2) and correlation coefficient ρ are:

	RCTs or nonrandomized intervention trials with external comparison with only follow-up outcome reported	Nonrandomized intervention trials with pre/post comparison
X_1	Mean of comparison group	Mean of baseline
X_2	Mean of intervention group	Mean of follow-up
ρ_{X_1, X_2}	0	0, 0.5, or 0.9 ^a

^a $\rho=0.9$ for when the individuals are exactly the same and there is no dropout, 0.5 for when the individuals are the same but there is some dropout, or 0 for when different individuals are sampled from the same population.

For RCTs and nonrandomized intervention trials with external comparison group with both baseline and follow-up outcomes reported:

$$SE\left(\frac{X_4 - X_3}{X_3} - \frac{X_2 - X_1}{X_1}\right) = \sqrt{SE\left(\frac{X_2 - X_1}{X_1}\right)^2 + SE\left(\frac{X_4 - X_3}{X_3}\right)^2}$$

X_1 =Mean outcome of the comparison group at baseline;
 X_2 =Mean outcome of the comparison group at follow-up;
 X_3 =Mean outcome of the intervention group at baseline;
 X_4 =Mean outcome of the intervention group at follow-up.

CALCULATION OF THE ESTIMATE AND SE OF THE DIFFERENCE FOR THE OUTCOME DATA REPORTED AS CATEGORICAL VARIABLE

Based on study design, estimates of differences were determine as described in the section above. We used the following formula to calculated SE of the proportional difference for the outcome data reported as categorical variable:

$$SE(P_2 - P_1) = \sqrt{\frac{P_1 \times (1 - P_1)}{n_1} + \frac{P_2 \times (1 - P_2)}{n_2} - \frac{2 \times \rho_{P_1, P_2} \times P_1 \times P_2 \times (1 - P_1) \times (1 - P_2)}{\sqrt{n_1 \times n_2}}}$$

Outcome results (P1, P2, n1, n2) and correlation coefficient ρ are:

	RCTs or nonrandomized intervention trials with external comparison with only follow-up outcome reported	Nonrandomized intervention trials with pre/post comparison
P_1	Proportion of the comparison group	Proportion at baseline
n_1	Sample size of the comparison group	Sample size at baseline
P_2	Proportion of the intervention group	Proportion at follow-up
n_2	Sample size of the intervention group	Sample size at follow-up
ρ_{P_1, P_2}	0	0, 0.5, 0.9\$

\$ \rho=0.9\$ for when the individuals are exactly the same and there is no dropout, 0.5 for when the individuals are the same but there is some dropout, or 0 for when different individuals are sampled from the same population.

For RCTs and nonrandomized intervention trials with external comparison group and with both baseline and follow-up proportions reported:

$$SE[(P_4 - P_3) - (P_2 - P_1)] = \sqrt{SE(P_2 - P_1)^2 + SE(P_4 - P_3)^2}$$

P_1 =Proportion outcome of the comparison group at baseline;

P_2 = Proportion outcome of the comparison group at follow-up;

P_3 = Proportion outcome of the intervention group at baseline;

P_4 = Proportion outcome of the intervention group at follow-up.

Appendix Table 1. Criteria for Assessment of Study Quality^a

Criterion	Values	Description
Design	1	Randomized trial
	0	Quasi-experimental design
Assessment of intervention/exposure	1	Intervention/exposure has been clearly defined and measured
	0	Intervention/exposure has not been clearly defined and measured
Assessment of outcome	1	Outcome has been clearly defined and measured
	0	Outcome definition and measurement has not been clearly described
Control for confounding	1	RCT or sufficient/ appropriate control for major confounders
	0	Insufficient control for major confounders
Evidence of selection bias	1	Absence of evidence for selection bias
	0	Substantial presence of evidence for selection bias

^aTo generate an overall study score, each criterion was coded as either 0 or 1, and then the values were summed. The total score could range from 0 to 5, with scores of 3–5 considered as higher quality.

Appendix Table 2. Label Type Category

Label type	Explanation	Examples
Quantity value	Numeric information about the content value of energy or nutrients	Absolute content value of a specific nutrient, %RDI/DIG/GDA, % energy, Nutrition Facts panel
Nutrition or health claim	A text claim based on the content of energy, content of nutrients, or potential health effects	“low sodium”, “fat free”, “lower cholesterol”, “reduce osteoporosis risk”
Logo	A uniform symbol applied for products meeting a certain set of nutritional criteria	Green Keyhole, Choice logo, Heart-Check
Grading system	A symbol or text system showing relative differences between products, based on the extent to which each product meets the criteria	Traffic light, health star rating, color code, recommendation grade
Physical activity equivalent	The amount of physical activity required to consume the amount of energy contained in the labeled product	“minutes to run”, “miles to walk”

RDI/DIG/GDA, recommended daily intake/dietary intake guide/guidelines for daily amounts.

Appendix
A Meta-analysis of Food Labeling Effects on Consumer Diet Behaviors and Industry Practices
Shangguan et al.

Appendix Table 3. Study and Population Characteristics: RCTs

Study	Country	Site	Setting	Population	Race	SES	Funding source	Quality score ^a
James 2015 ⁴⁹	U.S.	Cafeterias	University	Adults	Primarily white	Multiple	Academic	5
Lowe 2010 ⁵⁰	U.S.	Cafeterias	Hospital	Adults	Primarily white	NR	Government	3
Steenhuis 2004-a ⁵¹	Netherlands	Cafeterias	Company	Adults	NR	Primarily high	Academic	5
Stubenitsky 2000 ⁵²	UK	Restaurants	Community	Adults	NR	High	Academic	4
Steenhuis 2004-b ⁵³	Netherlands	Supermarkets	Community	NR	NR	Multiple	NR	5
Bergen 2006 ⁵⁴	U.S.	Vending machines	University	Adults	NR	Primarily high	Academic	4
Roberto 2012 ⁵⁵	U.S.	Classrooms	Community	Adults	Primarily white	Multiple	Foundation	5
Roberto 2010 ⁵⁶	U.S.	Classrooms	Community	Adults	Primarily white	Multiple	Foundation	5
Harnack 2008 ⁵⁷	U.S.	Urban church	Community	Adults and children	Multiple	Primarily low	Government	4
Goodman 2013 ⁵⁸	Canada	“Room”, not specified	Community	Adults	Primarily white	Primarily high	Academic	5
Temple 2011b ⁵⁹	U.S.	Laboratories	University	Adults	Primarily white	Multiple	NR	4
Miller 1998 (crossover) ⁶⁰	U.S.	Laboratories	University	Adult men	NR	Multiple	Government, Industry	5
Hammond 2013 ⁶¹	Canada	Laboratories	Community	Adults	Primarily white	Primarily high	Academic	4
Gravel 2012 ⁶²	Canada	Laboratories	University	Adult men	NR	Multiple	Academic	4
Steenhuis 2010 (crossover) ⁶³	Netherlands	Laboratories	University	Adult women	NR	Primarily high	NR	5
Bushman 1998 ⁶⁴	U.S.	NR	University	Adults	NR	Multiple	NR	5

^aCalculated based on five criteria (Appendix Table 1), with total score ranging from 0 to 5 and scores of 3–5 considered as higher quality.

UK, United Kingdom; NR, not reported.

Appendix
A Meta-analysis of Food Labeling Effects on Consumer Diet Behaviors and Industry Practices
Shangguan et al.

Appendix Table 4. Study Intervention Characteristics: RCTs

Study	Label type(s) ^a	Label placement	Labeled product	Dietary target(s)	Intervention duration (weeks)	Other combined intervention
James 2015 ⁴⁹	1. Absolute content value. 2. Physical activity-based energy content (minutes to walk)	Menu	Meals	Energy	Single session	
Lowe 2010 ⁵⁰	Grading system (color coding) plus absolute content value	NR	Meals	Energy, total fat, total carbohydrate, protein	12	Direct regulation, with or without education and economic incentives
Steenhuis 2004-a ⁵¹	Logo plus content claim	NR	Butter/margarine, milk, cheese, meat products, desserts, snacks, fruits, vegetables	Total fat, fruit, vegetable	26	
Stubenitsky 2000 ⁵²	Content claim	Menu	Meals	Total fat	Single session	
Steenhuis 2004-b ⁵³	Logo plus content claim	On-shelf	Products in 9 food product categories	Total fat	8	With education, tested against 2 arms: education only and control
Bergen 2006 ⁵⁴	Absolute content value	Outside vending machine	SSB and water	Energy, total carbohydrate	5	Factorial: with or without mass media campaign
Roberto 2012 ⁵⁵	1. Logo plus absolute content value per serving size. 2. Logo plus absolute content value per 3/4 cup	Package	Cereal	Energy	Single session	
Roberto 2010 ⁵⁶	1. Absolute content value. 2. Absolute content value plus RDI.	Menu	Meals	Energy	Single session	

Appendix
A Meta-analysis of Food Labeling Effects on Consumer Diet Behaviors and Industry Practices
Shangguan et al.

Harnack 2008 ⁵⁷	Absolute content value	Menu	Meals	Energy	Single session	
Goodman 2013 ⁵⁸	1. Absolute content value plus % DAI. 2. 1 plus content claim. 3. 2 plus traffic light system. 4. Traffic light system plus content claim	Package	Snacks	Sodium	Single session	
Temple 2011b ⁵⁹	Traffic light system	NR	Meals	Energy, total fat, sugar	Two sessions	Factorial: With or without economic incentives
Miller 1998 (crossover) ⁶⁰	Content claim, nutrition facts panel	Package	Regular and fat-free potato chips	Total fat	2	
Hammond 2013 ⁶¹	1. Absolute content value (energy). 2. Absolute content value plus traffic light system (energy). 3. Absolute content value plus traffic light system (energy, total fat, sodium, sugar)	Menu	Meals	Energy, total fat, sodium, sugar	Single session	
Gravel 2012 ⁶²	1. Content claim. 2. Health claim. 3. Hedonic claim(control)	Instruction leaflet	Sweets	Whole grains, fiber, saturated fat, trans fat	Single session	
Steenhuis 2010 (crossover) ⁶³	Logo	Package	Chocolate mousse cake	Energy, saturated fat, trans fat, sodium, sugar, fiber	Two sessions	
Bushman 1998 ⁶⁴	% of energy plus health claim	NR	Cream cheese	Total fat	Single session	

^aNone were mandated by law nor implemented nationwide.

NR, not reported; SSB, sugar sweetened beverage; RDI, recommended daily intake; DAI, daily adequate intake.

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Appendix Table 5. Study Outcomes and Quality Scores: RCTs

Study	Relevant outcomes reported	Outcome type ^a	Assessment of quality ^b				
			Design	Exposure assessment	Outcome assessment	Control of confounding	Selection bias
James 2015 ⁴⁹	Total calories, total fat, total carbohydrate, protein	Intake, order	1	1	1	1	1
Lowe 2010 ⁵⁰	Total calories, total fat, blood lipid level, body weight	Purchases, intake, biomarker, adiposity	1	0	1	1	0
Steenhuis 2004-a ⁵¹	Total fat, fruits, vegetables	Purchases, sales	1	1	1	1	1
Stubenitsky 2000 ⁵²	Total calories, total fat, low-fat item, full-fat stir fry beef, full-fat pasta	Order	1	1	0	1	1
Steenhuis 2004-b ⁵³	Total fat	Intake	1	1	1	1	1
Bergen 2006 ⁵⁴	Water, diet soda, soda	Sales	1	1	0	1	1
Roberto 2012 ⁵⁵	Cereal	Amount poured, intake	1	1	1	1	1
Roberto 2010 ⁵⁶	Total calories	Order, intake	1	1	1	1	1
Harnack 2008 ⁵⁷	Total calories, total fat, total carbohydrates, protein, saturated fat, dietary fiber, vitamin C, calcium	Order, intake	1	1	0	1	1
Goodman 2013 ⁵⁸	Low-sodium crackers	Order	1	1	1	1	1
Temple 2011b ⁵⁹	“Green options”, “Amber options”, and “Red options” in traffic light system	Intake	1	0	1	1	1
Miller 1998 (crossover) ⁶⁰	Total calories, total fat	Intake	1	1	1	1	1
Hammond 2013 ⁶¹	Total calories	Order, intake	1	1	0	1	1
Gravel 2012 ⁶²	Oatmeal-raisin cookies	Intake	1	1	0	1	1
Steenhuis 2010 (crossover) ⁶³	Chocolate mousse cake with Choice logo	Intake	1	1	1	1	1
Bushman 1998 ⁶⁴	Full-fat cream cheese, reduced-fat cream cheese, no-fat cream cheese	Order (categorical)	1	1	1	1	1

^aAll outcomes were evaluated continuously, unless otherwise indicated.

^bAppendix Table 1 provides details on each.

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Appendix Table 6. Study and Population Characteristics: Non-Randomized Intervention Trials With External Comparison

Study	Country	Site	Setting	Population	Race	SES	Funding source	Quality score ^a
Lassen 2014 ⁶⁵	U.S.	Cafeterias	Hospital	Adults	NR	Multiple	Government, industry	3
Thorndike 2012 ⁶⁶	U.S.	Cafeterias	Hospital	Adults	NR	NR	Government, Academic	3
Levin 1996 ⁶⁷	U.S.	Cafeterias	Government worksite	Adults	Primarily Hispanic	NR	NR	1
Vanderlee 2013 ⁶⁸	Canada	Cafeterias	Hospital	Adults	Primarily white	Multiple	Government, Academic	3
Uglen 2013 ⁶⁹	Norway	Cafeterias	Military camps	Adult men	NR	Primarily low	Government	2
Aaron 1995 ⁷⁰	UK	Cafeterias	University	Adults	NR	NR	NR	3
Auchincloss 2013 ⁴⁵	U.S.	Restaurants	Community	NR	Primarily black	Multiple	Government	2
Lee-Kwan 2014 ⁷¹	U.S.	Restaurants	Community	NR	NR	Low	Academic	2
Brissette 2013 ⁷²	U.S.	Restaurants	Community	Adults	Primarily white	Primarily low	Government	2
Namba 2013 ⁷³	U.S.	Restaurants	Community	N/A	N/A	N/A	Government, Academic	2
Saelens 2012 ⁷⁴	U.S.	Restaurants	Community	N/A	N/A	N/A	Government, foundation	1
Elbel 2011 ⁷⁵	U.S.	Restaurants	Community	Children	Primarily black	Low	Government, Academic, foundation	3
Vadiveloo 2011 ⁷⁶	U.S.	Restaurants	Community	Adults	Primarily black	Primarily low	Government, foundation	3
Basset 2008 ⁷⁷	U.S.	Restaurants	Community	NR	NR	NR	NR	1
Gittelsohn 2010 ⁷⁸	U.S.	Supermarkets, Grocery stores	Community	NR	Primarily black	Low	Government, Academic	1
Patterson 1992 ⁷⁹	U.S.	Supermarkets	Community	NR	NR	NR	NR	0
Louie 2012 ⁸⁰	Australia	Supermarkets	Community	N/A	N/A	N/A	Academic; foundation; other non-profit	1
Ogawa 2011 ⁸¹	Japan	Supermarkets	Community	NR	NR	NR	NR	2

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Vermeer 2011 ⁸²	Netherlands	Shops	Recreation facility	Adults	NR	Multiple	Government	3
Temple 2011a (crossover) ⁵⁹	U.S.	Laboratories	University	Adult women	Primarily Asian	Multiple	NR	4
Kral 2002 ⁸³	U.S.	Laboratories	University	Adult women	NR	NR	Government	3
Shide 1995 ⁸⁴	U.S.	Laboratories	Community	Adult women	NR	NR	NR	3
Brannstrom 1993 ⁸⁵	Sweden	NR	Community	Adult men	NR	Primarily low	Government	3

^aCalculated based on five criteria (Appendix Table 1), each coded as either 0 or 1 and with values summed. The total score could range from 0 to 5, with 3–5 considered as higher quality.

NR, not reported; UK, United Kingdom; N/A, not applicable.

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Appendix Table 7. Study Intervention Characteristics: Non-Randomized Intervention Trials With External Comparisons

Study	Label type(s)	Label placement	Labeled product	Dietary target(s)	Intervention duration (weeks)	Other combined intervention
Lassen 2014 ⁶⁵	Logo	NR	Meals	Energy, total fat, fruit, vegetable, sodium, sugar, whole grains	30	
Thorndike 2012 ⁶⁶	Traffic light system	Menu, on-shelf, package	All products sold (4 groups: food entree, food item, food condiment, beverage)	Fruit, vegetable, whole grains, total fat, saturated fat, energy	13	
Levin 1996 ⁶⁷	Logo	Menu	Meals	Total fat	28	
Vanderlee 2013 ⁶⁸	Absolute content value, logo	Menu	Meals	Energy, total fat, saturated fat, sodium	34.8	Direct regulation, mass media campaign
Uglen 2013 ⁶⁹	Health Claim	Posters, brochures, and folders	Meals	Whole grains, vegetables	22	Direct regulation
Aaron 1995 ⁷⁰	Absolute content value, % of energy, content graphic info (bar and pie charts)	Next to the labeled items	Meals	Energy, total fat	1	
Auchincloss 2013 ⁴⁵	Absolute content value ^a	Menu	Meals	Energy, saturated fat, trans fat, total carbohydrate, sodium	87	
Lee-Kwan 2014 ⁷¹	Logo	Menu	Meals	Energy, total fat	24	3 phases with each successive phase built on the previous phase and food labeling existing throughout

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						the three phases: 1. Mass media campaign; 2. Direct regulation; 3. Economic incentives.
Brissette 2013 ⁷²	Absolute content value ^a	Menu	Meals	Energy	NR	
Namba 2013 ⁷³	Absolute content value ^{a,b}	Menu	Meals	Energy, saturated fat, sodium, cholesterol, fiber	364	
Saelens 2012 ⁷⁴	Absolute content value ^a	Menu	Meals	Energy, saturated fat, total carbohydrate, sodium	26	
Elbel 2011 ⁷⁵	Absolute content value ^a	Menu	Meals	Energy	4	
Vadiveloo 2011 ⁷⁶	Absolute content value ^a	Menu	Meals	Energy	4	
Basset 2008 ⁷⁷	Absolute content value	Menu	Meals	Energy	8	
Gittelsohn 2010 ⁷⁸	Various labels including content claim, health claim and logo	On-shelf, informational posters and fliers	Phase 1: breakfast (cereals, milk); phase 2: cooking spray (eggs, pancakes, vegetables); phase 3: snacks (low-fat snacks, fresh fruits); phase 4: carry-out (bread, mayonnaise); phase 5: beverage (diet soda)	Total fat, sugar, fiber	43	Education, economic incentives, direct regulation
Patterson 1992 ⁷⁹	Logo, absolute content value, other grading system	On-shelf	Recommended products within 8 categories of foods:	Energy, fiber, total fat, cholesterol, sodium	104	Mass media campaign

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	(recommendation grades)		dry cereal, baked goods, fresh produce, frozen vegetables, canned vegetables, canned and frozen beans, dried beans, and dried fruit			
Louie 2012 ⁸⁰	% DIG	Package	Cereals	Energy, protein, total fat, saturated fat, total carbohydrates, sugar, fiber, sodium, vitamins, minerals, micronutrients	208	
Ogawa 2011 ⁸¹	Health claim, content claim	Posters	Vegetables and fruits	Vegetables, fruits	13	Mass media campaign
Vermeer 2011 ⁸²	Portion size, % GDA	An information display at POP	SSBs	Energy	Single session	
Temple 2011a (crossover) ⁵⁹	1. nutrition facts panel. 2. traffic light system.	NR	Meals	2 types of labels with different target: 1. calories, macro and micro nutrients; 2. energy, total fat, sugar	Three sessions	
Kral 2002 ⁸³	Absolute content value	NR	Meals	Energy	0.43	
Shide 1995 ⁸⁴	Content claim	Next to the labeled items	Yogurts	Total fat	Single session	
Brannstrom 1993 ⁸⁵	Logo	NR	All foods being sold	Total fat, fiber	156	Education, health service

^aMandated by law.

^bNationwide implementation.

NR, not reported; DIG, daily intake guide; GDA, guidelines for daily amounts; POP, point of purchase; SSB, sugar sweetened beverage.

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Appendix Table 8. Study Outcomes and Quality Scores: Non-Randomized Intervention Trials With External Comparisons

Study	Relevant outcomes reported	Outcome type ^a	Adjusted covariates	Assessment of quality ^b				
				Design	Exposure assessment	Outcome assessment	Control of confounding	Selection bias
Lassen 2014 ⁶⁵	Total calories, total fat, fruits and vegetables, salt, energy density	Intake		0	1	1	0	1
Thorndike 2012 ⁶⁶	Red items, yellow items, green items	Sales		0	1	0	1	1
Levin 1996 ⁶⁷	Labeled healthy entrees	Sales		0	1	0	0	0
Vanderlee 2013 ⁶⁸	Total calories, sodium, saturated fat, total fat	Intake		0	0	1	1	1
Uglem 2013 ⁶⁹	Vegetables, fruits, fruit juice, potatoes, white bread, semi-whole grain bread	Intake	Season	0	0	1	1	0
Aaron 1995 ⁷⁰	Total calories, total fat, total carbohydrates, protein	Intake, purchases		0	1	1	0	1
Auchincloss 2013 ⁴⁵	Total calories, alcoholic beverage, non-alcoholic beverage, saturated fat, trans fat, total carbohydrates, sodium	Purchases		0	1	0	0	1
Lee-Kwan 2014 ⁷¹	Total healthy items	Sales		0	0	0	1	1
Brissette 2013 ⁷²	Total calories	Purchases		0	1	0	1	0
Namba 2013 ⁷³	Total calories, cholesterol, fiber, saturated fat, sodium	Reformulation		0	1	0	0	0
Saelens 2012 ⁷⁴	Healthy options	Availability		0	0	0	0	1
Elbel 2011 ⁷⁵	Total calories	Purchases		0	1	1	0	1
Vadiveloo 2011 ⁷⁶	Caloric beverage, green salad, regular fat salad dressing, French fries, adding cheese to hamburgers/sandwiches, dessert	Purchases		0	1	1	0	1
Basset 2008 ⁷⁷	Total calories	Purchases		0	1	0	0	0
Gittelsohn 2010 ⁷⁸	“Healthy food getting score” and “healthy food preparation score”	Intake		0	0	1	0	0
Patterson 1992 ⁷⁹	Recommended(labeled) dry cereal products, baked goods, fresh	Sales		0	0	0	0	0

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	produce, frozen vegetables, and canned vegetables							
Louie 2012 ⁸⁰	Total calories, protein, total fat, saturated fat, total carbohydrate, sugar, fiber, sodium	Reformulation		0	1	0	0	0
Ogawa 2011 ⁸¹	Vegetables, fruits	Sales	Number of visitors	0	0	0	1	1
Vermeer 2011 ⁸²	SSB	Order, intake		0	1	0	1	1
Temple 2011a (crossover) ⁵⁹	Total calories	Intake		0	1	1	1	1
Kral 2002 ⁸³	Total calories	Intake		0	1	1	0	1
Shide 1995 ⁸⁴	Total calories	Intake		0	1	1	0	1
Brannstrom 1993 ⁸⁵	Hypertension, hypercholesterolaemia, obesity	Adiposity, biomarker (categorical)		0	0	1	1	1

^aAll outcomes were evaluated continuously, unless otherwise indicated.

^bAppendix Table 1 provides details on each.

SSB, sugar sweetened beverage.

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Appendix Table 9. Study and Population Characteristics: Non-Randomized Intervention Trials With Pre/Post Comparisons

Study	Country	Site	Setting	Population	Race	SES	Fund source	Quality score ^a
Sato 2013 ⁸⁶	U.S.	Cafeterias	Hospital	Adults	NR	NR	NR	1
Sonnenberg 2013 ⁸⁷	U.S.	Cafeterias	Hospital	Adults	Primarily white	NR	NR	2
Freedman 2011 ⁸⁸	U.S.	Cafeterias	University	Adults	NR	NR	Other non-profit	4
Hoefkens 2011 ⁸⁹	Belgium	Cafeterias	University	Adults	NR	NR	Academic	4
Krieger 2013 ⁹⁰	U.S.	Cafeterias, restaurants	Community	Adults and children	Primarily white	Primarily low	Foundation	2
Wu 2014 ⁹¹	U.S.	Restaurants	Community	N/A	N/A	N/A	Academic, foundation	1
Dumanovsky 2011 ⁹²	U.S.	Restaurants	Community	Adults	NR	Multiple	Government, foundation	4
Horgen 2002 ⁹³	U.S.	Restaurants	Community	NR	NR	NR	NR	1
Fotouhinia-Yepes 2013 ⁹⁴	Switzerland	Restaurants	Hospital	NR	NR	NR	NR	2
Thunstrom 2011 ⁹⁵	Sweden	Restaurants	Company	Adults	NR	Primarily low	NR	2
Bell 2013 ⁹⁶	Australia	Restaurants, vending machines	Hospital	N/A	N/A	N/A	Government	0
Lee 2010 ⁹⁷	Korea, South	Restaurants, food markets	Community	N/A	N/A	N/A	Government	3
Ricciuto 2008 ⁹⁸	Canada	Supermarkets	Community	N/A	N/A	N/A	NR	1
Bleich 2014 ⁹⁹	U.S.	Grocery stores	Middle and high school	Children	Black	Low	Foundation	3
Bleich 2012 ¹⁰⁰	U.S.	Grocery stores	High school	Children	Black	Low	Government, foundation	2
Olstad 2015 ¹⁰¹	Canada	Shop	Recreation facility	Adults and children	NR	NR	Foundation	3
Hoerr 1993 ¹⁰²	U.S.	Vending machines	University	Adults	NR	NR	NR	2

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Friesen 2006 ¹⁰³	Canada	Diverse food establishments	Community	Adult breastfeeding mothers	NR	Multiple	NR	4
Vesper 2012 ¹⁰⁴	U.S.	NR	Community	NR	Multiple	Multiple	Foundation	3
Ippolito 1991 ¹⁰⁵	U.S.	NR	Community	Adult women	NR	Multiple	NR	3
Vyth 2010 ¹⁰⁶	Netherlands	NR	Community	N/A	N/A	N/A	Foundation	2

^aCalculated based on five criteria (Appendix Table 1), with total score ranging from 0 to 5 and scores of 3–5 considered as higher quality.

NR, not reported; N/A, not applicable.

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Appendix Table 10. Study Intervention Characteristics: Non-Randomized Intervention Trials With Pre/Post Comparisons

Study	Label type	Label placement	Labeled product	Dietary target	Intervention duration (weeks)	Other combined intervention
Sato 2013 ⁸⁶	Absolute content value, % of daily value	NR	Meals	Energy, total fat, sodium	8	Direct regulation
Sonnenberg 2013 ⁸⁷	Traffic light system	Menu, on-shelf, package	Meals	Energy, saturated fat, total fat, fruit, vegetable, whole grains	NR	
Freedman 2011 ⁸⁸	Absolute content value, % of energy	On-shelf, posters, brochures	Meals	Energy, total fat	4	
Hoefkens 2011 ⁸⁹	Other grading system (star)	NR	Meals	Energy, saturated fat, sodium, vegetable	12	
Krieger 2013 ⁹⁰	Absolute content value ^a	Menu	Multiple	Energy	64.29	
Wu 2014 ^{91 b}	Absolute content value ^{a,c}	Menu	Meals	Energy	52	
Dumanovsky 2011 ⁹²	Absolute content value ^a	Menu	Meals	Energy	104	
Horgen 2002 ⁹³	Health Claim	NR	Meals	NR	1.14	
Fotouhinia-Yepes 2013 ⁹⁴	Absolute content value	Menu	Meals	Energy	3	
Thunstrom 2011 ⁹⁵	Logo	Menu	Meals	Energy, total fat, sugar, sodium, fiber	6	
Bell 2013 ⁹⁶	Traffic light system ^a	On-shelf, outside vending machine	Beverages and commercial ready-to-eat or pre-packaged foods	NR	208	Direct regulation
Lee 2010 ⁹⁷	Nutrition facts panel, absolute content value, content claim ^{a,c}	Package	Cereals, French fries, fried chicken, biscuits, cakes, instant soup powders, canned coffees	Trans fat	52	
Ricciuto 2008 ⁹⁸	Absolute content value ^{a,c}	Package	Margarine	Trans fat	NR	

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Bleich 2014 ⁹⁹	1. Absolute content value of energy. 2. Absolute content value of sugar. 3. Physical activity equivalent (minutes to run). 4. Physical activity equivalent (miles to walk).	Next to the labeled items	SSBs	4 types of labels with 3 targeting energy and 1 targeting sugar	2	
Bleich 2012 ¹⁰⁰	Absolute content value, % of energy, physical activity equivalent	Next to the labeled items	SSBs, diet soda, water, 100% juice	Energy	2	
Olstad 2015 ¹⁰¹	Traffic light system	Menu, on-shelf	Meals	Total fat, sodium, total carbohydrate, fiber, sugar, trans fat, saturated fat, calcium, vitamin D, protein, iron	1	
Hoerr 1993 ¹⁰²	Nutrition facts panel	On-shelf within vending machine	Snacks of low, moderate and high nutritional quality	Energy, protein, vitamin A, vitamin C, vitamin B1 (thiamine), vitamin B2 (riboflavin), vitamin B3 (niacin), calcium, iron	52	Direct regulation
Friesen 2006 ¹⁰³	Absolute content value ^{a,c}	Package	All retail foods	Trans fat	372	
Vesper 2012 ¹⁰⁴	Absolute content value (added to previous existing nutrition facts panel) ^{a,c}	Package	All packaged products	Trans fat	313	
Ippolito 1991 ¹⁰⁵	Absolute content value, health claim	Package	Cereal	Fiber	468	
Vyth 2010 ¹⁰⁶	Logo	Package	Vegetables, fruits, potatoes, bread or grain products, meat, fish, eggs or meat substitutes, dairy products,	Sodium, sugar, saturated fat, trans fat, energy, fiber	52	

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cheese products, oils and fats, meals, sandwiches, soups, sauces, snacks, beverages, etc.

^aMandated by law.

^bThis is a pre-post study of the 2010 Affordable Care Act menu labeling passage.

^cNationwide implementation.

NR, not reported; SSB, sugar sweetened beverage.

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Appendix Table 11. Study Outcomes and Quality Scores: Non-Randomized Intervention Trials With Pre/Post Comparisons

Study	Relevant outcomes reported	Outcome type ^a	Adjusted covariates	Assessment of quality ^b				
				Design	Exposure assessment	Outcome assessment	Control of confounding	Selection bias
Sato 2013 ⁸⁶	Labeled healthy entrees, regular entrees	Purchases (categorical)		0	1	0	0	0
Sonnenberg 2013 ⁸⁷	“Red” items, “yellow” items, “green” items	Purchases (categorical)		0	1	1	0	0
Freedman 2011 ⁸⁸	French fries	Sales		0	1	1	1	1
Hoefkens 2011 ⁸⁹	Total calories, saturated fat, sodium, vegetables, total carbohydrates, protein, total fat	Intake, purchases, availability (all both)		0	1	1	1	1
Krieger 2013 ⁹⁰	Total calories	Purchases		0	1	0	0	1
Wu 2014 ⁹¹	Total calories, sodium	Reformulation		0	0	0	0	1
Dumanovsky 2011 ⁹²	Total calories	Purchases	Restaurant chain, sex, neighborhood poverty, number of food items purchased, beverage purchase and cost	0	1	1	1	1
Horgen 2002 ⁹³	Chicken sandwiches, salads, soup cups, soup bowls	Sales		0	1	0	0	0
Fotouhinia-Yepes 2013 ⁹⁴	Low calorie “menu degustation”, high calorie “menu creation”	Sales (categorical)		0	1	0	0	1
Thunstrom 2011 ⁹⁵	Total calories, total carbohydrate, total fat, saturated fat, fiber, sodium, sucrose, red meat, chicken or turkey, fish or seafood, vegetarian, potatoes, pasta, rice	Intake		0	1	0	0	1
Bell 2013 ⁹⁶	Amber/green options, red beverages 375 ml or less	Availability (categorical)		0	0	0	0	0

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Lee 2010 ⁹⁷	Trans fat, total fat	Reformulation		0	1	1	0	1
Ricciuto 2008 ⁹⁸	Saturated fat, trans fat, PUFA, MUFA	Reformulation		0	1	0	0	0
Bleich 2014 ⁹⁹	Total calories, SSB	Purchases (both)		0	1	0	1	1
Bleich 2012 ¹⁰⁰	SSB	Purchases (categorical)	Sex, store, time, weekday, weekend	0	1	0	0	1
Olstad 2015 ¹⁰¹	“Red” main dishes/snacks/beverages, “yellow” main dishes/snacks/beverages, “green” main dishes/snacks/beverages	Purchases (categorical)		0	1	0	1	1
Hoerr 1993 ¹⁰²	Low nutrient dense snacks, moderate nutrient dense snacks, high nutrient dense snacks	Sales (categorical)		0	1	0	0	1
Friesen 2006 ¹⁰³	Trans fat, saturated fat, unsaturated fat and CLA levels in human milk	Biomarker		0	1	1	1	1
Vesper 2012 ¹⁰⁴	Plasma trans fat levels	Biomarker		0	1	1	0	1
Ippolito 1991 ¹⁰⁵	Fiber cereals	Intake (categorical)		0	1	1	0	1
Vyth 2010 ¹⁰⁶	Total calories, saturated fat, trans fat, added sugar, sodium, fiber	Reformulation	Food group	0	1	1	0	0

^aAll outcomes were evaluated continuously, unless otherwise indicated.

^bAppendix Table 1 provides details on each.

PUFA, polyunsaturated fatty acid; MUFA, monounsaturated fatty acid; SSB, sugar sweetened beverage; CLA, conjugated linoleic acids.

Appendix Table 12. Effectiveness of Food Labeling on Consumer Dietary Behaviors in Intervention Studies (Prioritizing Intake Data)^a

Dietary factor	Number of study estimates (individual studies)	Number of purchases or consumers	Percent change with labeling (95% CI)^b
Calories	31 (23)	43,707	−6.5 (−8.7, −4.3)
Total fat	13 (12)	4,409	−10.3 (−17.4, −3.2)
Total carbohydrate	8 (7)	1,928	2.4 (−5.0, 9.7)
Total protein	6 (5)	1,110	0.9 (−2.9, 4.7)
Saturated fat	5 (5)	2,227	−8.3 (−23.6, 7.0)
Sodium	5 (5)	2,016	−15.3 (−31.3, 0.7)
Vegetables	5 (5)	1,497	13.5 (2.4, 24.6)
Fruits	3 (3)	1,103	10.9 (−16.0, 37.7)
Whole grains	3 (2)	760	14.4 (−11.8, 40.6)
Other healthy options ^c	30 (11)	2,685	−0.5 (−2.7, 1.8)
Other unhealthy options ^d	16 (7)	5,548	−13.0 (−25.7, −0.2)

^aFood labeling (i.e., standardized provision of nutrition or healthfulness information) includes product package, menu, or other point-of-purchase labeling. Dietary behaviors were evaluated by direct observation (e.g., weighed plate waste) or self-report from single sessions, 24-hour diet recalls, food diaries, or food frequency questionnaires; or as consumer purchases, food outlet sales, or choices/orders as a proxy for consumption. When the same study evaluated both sales/purchase data and consumer intake data, we utilized consumer intake data here. Pooled findings using sales/purchase data for these studies were not appreciably different (Table 2). Appendix Figures 1–18 provide individual Forest plots and details on each meta-analysis above. Results stratified by consumer intake vs. purchases/sales are also available but not shown.

^bThe percent change in continuous outcomes, based on the units reported in the study (e.g., most commonly kcal for calories, gram or percent energy for dietary fats, servings or gram for foods, etc.).

^cItems recommended by labels to consume, such as salads, soups, low-fat dairy, lean meat, low-fat desserts, fish and seafood, water, diet soda, and foods higher in dietary fiber, vitamin C, and calcium.

^dItems recommended by labels to avoid, such as sugar-sweetened beverages, alcoholic beverages, non-alcoholic caloric beverages, French fries, potatoes, white bread, and foods higher in saturated fat, trans fat, added sugars or sodium.

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Appendix Table 13. Meta-Analyses of Effects of Food Labeling Interventions on Industry Reformulations (Continuous Outcomes)^a

Content	Number of study estimates (individual studies)	Number of products	Percent difference with labeling (95% CI)^b
Calories	4 (4)	29,324	0.9 (−3.1, 4.9)
Saturated fat	4 (4)	1,771	−4.4 (−25.9, 17.2)
Sodium	4 (4)	28,425	−8.9 (−17.3, −0.6)
Trans fat	3 (3)	637	−64.3 (−91.1, −37.5)
Fiber	3 (3)	1,264	−5.8 (−35.4, 23.7)
Other healthy components ^c	3 (2)	1,009	−0.3 (−16.4, 15.7)
Other unhealthy components ^d	6 (4)	1,423	−6.6 (−15.0, 1.9)

^aFood labeling (i.e., standardized provision of nutrition or health information) includes package, menu, or other point-of-purchase labeling. Reformulations were evaluated by review of product labels or direct laboratory analysis. Appendix Figures 20–24 show individual forest plots and more details on each meta-analysis.

^bBased on the units reported in the study (e.g., most commonly kcal for calories, gram or percent energy for dietary fats, servings for foods, etc.).

^cItems recommended by labels to consume, such as foods higher in protein, polyunsaturated fats, or monounsaturated fats.

^dItems recommended by labels to avoid, such as foods higher in dietary fat, sugars or cholesterol.

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Appendix Table 14. Meta-Regression Analysis of Potential Modifiers of Effects of Food Labeling^a

Variable	Total calories			Total fat		
	Number of estimates	% Difference (95% CI)	<i>p</i> -heterogeneity ^b	Number of estimates	% Difference (95% CI)	<i>p</i> -heterogeneity ^b
Overall	31	−6.6 (−8.8, −4.4)		13	−10.6 (−17.7, −3.5)	
Region			0.06			0.08
U.S./Canada	27	−7.8 (−11.6, −4.1)		7	−18.3 (−31.1, −5.5)	
Europe/Australia	4	1.5 (−7.7, 10.6)		6	−1.5 (−15.4, 12.3)	
Asian	0	^c		0	^c	
Design			0.37			0.12
RCT	13	−4.5 (−10.3, 1.2)		8	−4.7 (−17.1, 7.8)	
Nonrandomized trial	18	−7.8 (−12.5, −3.1)		5	−20.2 (−36.0, −4.3)	
Site			0.09			0.68
Cafeteria	10	−9.3 (−15.1, −3.4)		8	−15.3 (−29.7, −0.9)	
Restaurant	8	−4.4 (−11.0, 2.1)		2	−3.1 (−33.7, 27.4)	
Market/Shop/Vending	2	−19.6 (−32.6, −6.6)		1	−0.04 (−40.6, 40.5)	
Laboratory ^d	11	−2.7 (−8.6, 3.3)		2	−2.8 (−32.9, 27.4)	
Other or all sites	0	^c		0	^c	
Setting			0.16			0.07
University/School	13	−4.4 (−9.9, 1.2)		5	−4.9 (−19.2, 9.3)	
Hospital/Worksite	4	−14.8 (−24.3, −5.3)		5	−23.6 (−38.1, −9.1)	
Community	14	−5.9 (−11.1, −0.6)		3	1.6 (−17.3, 20.5)	
Mean age			0.07			0.06
Per year	17	−0.6 (−1.3, 0.04)		9	−1.1 (−2.3, 0.1)	
Sex			0.53			0.46
Per % male	29	−0.1 (−0.3, 0.2)		11	0.3 (−0.6, 1.2)	
Race			0.09			0.29
Primarily white	13	−8.6 (−12.8, −4.4)		4	−16.4 (−39.3, 6.5)	
Primarily black/Black	4	−14.4 (−22.6, −6.3)		0	^c	
Primarily Asian	2	1.8 (−11.7, 15.3)		0	^c	
Mixed	1	5.6 (−12.4, 23.6)		1	5.5 (−44.6, 55.7)	
SES			0.64			0.38
High/Mostly high	3	−3.4 (−15.1, 8.4)		2	−1.4 (−32.5, 29.6)	
Mixed	15	−9.4 (−14.9, −3.8)		6	−19.3 (−37.2, −1.4)	
Low/Mostly low	7	−8.1 (−16.2, 0.1)		2	−0.4 (−33.7, 32.9)	
Label placement			0.85			0.58
Menu	19	−7.2 (−11.4, −2.9)		6	−9.4 (−23.6, 4.9)	
Package	1	−4.5 (−21.2, 12.2)		1	−10.5 (−45.3, 24.2)	
Other point-of-purchase	5	−4.9 (−13.1, 3.2)		2	2.3 (−20.8, 25.5)	
Label type ^e			0.05			0.51

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Quantity value (e.g., nutrition facts)	21	-5.7 (-10.0, -1.4)	6	-6.6 (-26.2, 13.0)	
Health or nutrient content claim	4	-0.5 (-8.8, 7.7)	4	7.4 (-20.8, 35.6)	
Logo	3	-12.3 (-22.6, -2.0)	5	-21.2 (-47.5, 5.2)	
Grading system (e.g., traffic light)	4	-1.9 (-11.2, 7.5)	2	-5.0 (-31.5, 21.5)	
PA equivalent	3	-8.1 (-16.2, -0.1)	1	-4.7 (-29.8, 20.5)	
Labeled product					0.83
Meals	24	-5.9 (-10.2, -1.5)	10	-12.4 (-25.3, 0.4)	0.74
Single foods	5	-8.0 (-17.3, 1.2)	1	-10.5 (-51.7, 30.6)	
Multiple	2	-9.3 (-22.7, 4.2)	2	-1.4 (-29.5, 26.7)	
Intervention duration					0.45
Per week ^b	31	-0.05 (-0.2, 0.1)	13	-1.0 (-1.6, -0.4)	<0.01
Mandated by law					0.93
Yes	6	-6.8 (-15.1, 1.5)	0	^c	—
No	25	-6.4 (-10.6, -2.3)	13	^c	
Intervention components					0.55
Labeling only	29	-6.2 (-10.0, -2.3)	11	-7.7 (-18.7, 3.3)	0.18
Multi-component	2	-10.4 (-23.9, 3.1)	2	-25.6 (-50.9, -0.3)	
Including compensatory intake ⁱ					0.26
Yes	5	-1.8 (-10.9, 7.3)	4	-4.6 (-23.5, 14.2)	0.42
No	26	-7.4 (-11.3, -3.4)	9	-13.3 (-26.1, -0.4)	
Study quality score					0.84
0 to 2	6	-7.2 (-15.2, 0.8)	1		0.85
3 to 5	25	-6.3 (-10.5, -2.1)	12	-10.8 (-22.0, 0.4)	

^aTo maximize statistical power and minimize the number of statistical comparisons, we only explored heterogeneity for outcomes having 10 or more total study estimates. Heterogeneity by nationwide implementation could not be evaluated because no labeling studies with this characteristic assessed these outcomes.

^bThis was assessed for each factor according to meta-regression, included multiple indicators and assessed likelihood ratio test.

^cCategory dropped from the meta-regression due to insufficient independent studies.

^dOnly included if the food was actually consumed; studies evaluating only ordering or theoretical/planned consumption were excluded.

^eLabel types are kept non-exclusive here for multicomponent labels, with all the components taken into consideration. Therefore the total N for these may sum to larger than the number of estimates.

^hSingle session lab studies were assigned a value of 0.33 day.

ⁱCompensatory intake means dietary intake outside the intervention timeframe or location. Studies utilizing FFQ or dietary recall as outcome assessment tools usually included compensatory intake.

PA, physical activity; FFQ, food frequency questionnaire.

Appendix Table 15. Meta-Analyses of Effects of Food Labeling Interventions on Consumer Intakes, Stratified by Study Design^a

Dietary factor	Percent change with labeling (95% CI)		
	RCT	Interventions with external controls	Interventions with pre/post comparisons
Total calories	−4.2 (−7.4, −1.1)	−6.7 (−14.7, 1.2)	−8.5 (−12.1, −4.9)
Total fat	−5.0 (−10.5, 0.6)	−28.8 (−67.7, 10.0)	−5.6 (−9.4, −1.9)
Total carbohydrates	8.8 (−2.0, 19.7)	−6.8 (−15.9, 2.2)	−3.3 (−4.8, −1.7)
Total protein	2.8 (−4.4, 10.0)	3.2 (−14.6, 21.0)	0.0 (−2.4, 2.4)
Saturated fat	10.3 (−7.2, 27.8)	−20.8 (−44.9, 3.4)	−2.6 (−4.0, −1.2)
Sodium	—	−24.8 (−45.9, −3.7)	−1.9 (−3.4, −0.4)
Vegetables	−1.9 (−5.8, 2.1)	37.9 (−9.3, 85.2)	7.9 (5.7, 10.2)
Fruits	−0.2 (−6.6, 6.2)	17.7 (−25.6, 61.0)	—
Whole grains	1.4 (−12.0, 14.7)	36.1 (24.2, 47.9)	—

^aAppendix Figures 1–18 provide further details on Forest plots.

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Appendix Table 16. Meta-Analyses of Effects of Food Labeling Interventions on Consumer Intakes, Stratified by Label Placement and Label Type^a

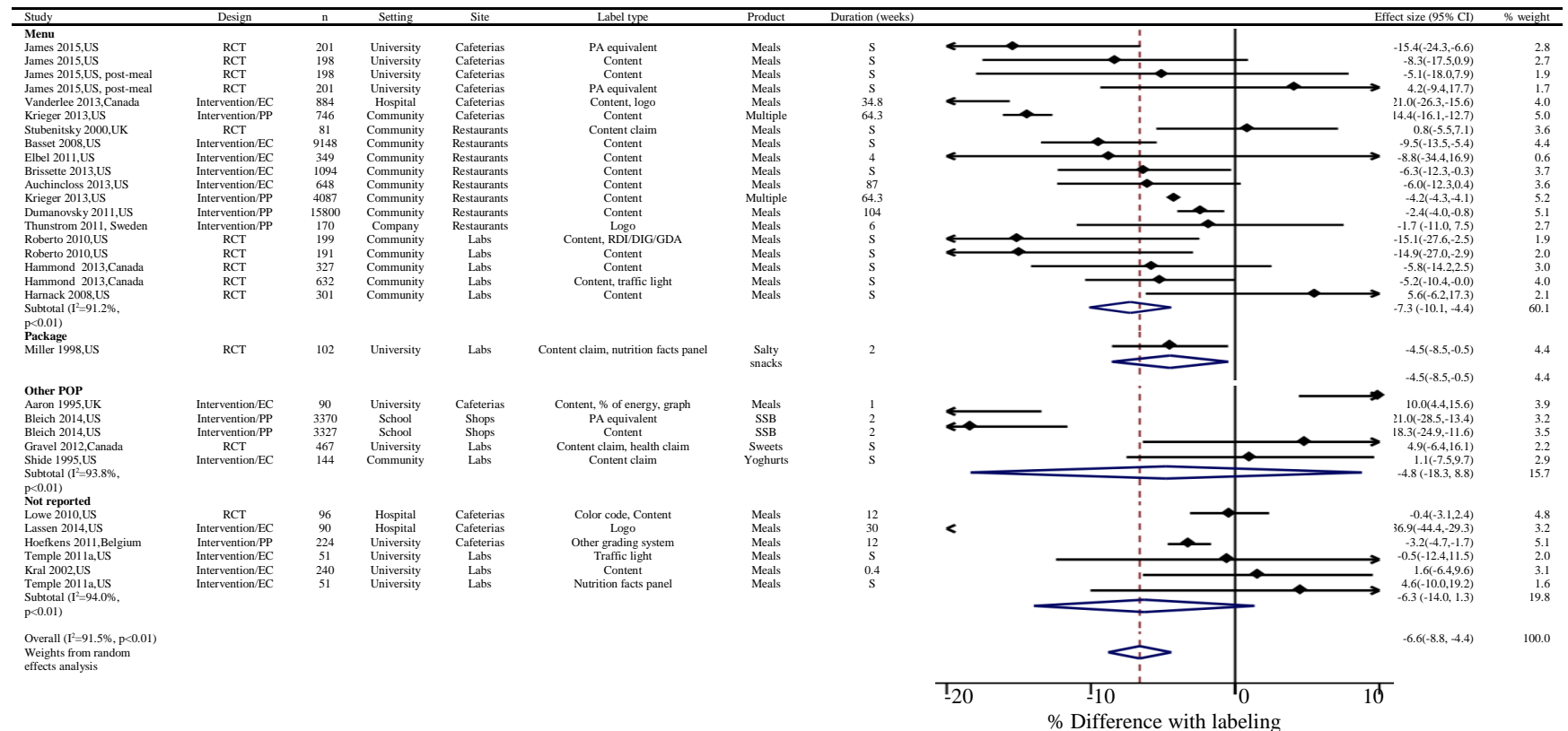
Stratifying variables	Percent change with labeling (95% CI)								
	Total calories	Total fat	Total carbohydrate	Total protein	Saturated fat	Sodium	Vegetable	Fruits	Whole grains
Label placement									
Menu	−7.3 (−10.1, −4.4)	−9.2 (−23.0, 4.6)	0.2 (−6.9, 7.3)	6.8 (0.2, 13.3)	−9.8 (−29.7, 10.1)	−10.0 (−23.8, 3.7)	−8.7 (−47.2, 29.8)	—	—
Package	−4.5 (−8.5, −0.5)	−10.5 (−20.1, −1.0)	—	—	—	—	—	—	1.3 (−12.0, 14.7)
Other point of purchase	−4.8 (−18.3, 8.8)	2.1 (−2.5, 6.7)	−2.9 (−5.1, −0.6)	3.2 (−14.6, 21.0)	—	—	37.9 (−9.3, 85.2)	17.7 (−25.6, 61.0)	36.1 (24.2, 47.9)
Not reported	−6.3 (−14.0, 1.3)	−18.9 (−33.6, −4.1)	8.7 (−15.0, 32.5)	−1.4 (−4.9, 2.0)	−2.6 (−4.0, −1.2)	−23.8 (−66.8, 19.3)	3.2 (−6.4, 12.8)	−0.2 (−6.6, 6.2)	—
Label type									
Quantity value	−5.8 (−8.8, −2.7)	1.2 (−6.6, 8.9)	−2.2 (−8.3, 4.0)	5.5 (−1.6, 12.6)	−0.5 (−18.4, 17.4)	−6.2 (−12.6, 0.3)	—	—	—
Health or nutrient content claim	1.6 (−3.1, 6.2)	0.0 (−8.2, 8.2)	—	—	—	—	37.9 (−9.3, 85.2)	17.7 (−25.6, 61.0)	36.1 (24.2, 47.9)
Logo	−19.4 (−53.8, 15.0)	−31.0 (−77.2, 15.1)	1.8 (−11.7, 15.2)	—	−3.8 (−27.2, 19.5)	−22.8 (−68.6, 23.0)	−8.7 (−47.2, 29.8)	—	—
Grading system	−3.1 (−4.6, −1.6)	−5.6 (−9.4, −1.7)	−3.4 (−4.9, 1.8)	0.0 (−2.4, 2.4)	−2.6 (−4.0, −1.2)	−1.9 (−3.5, −0.4)	8.0 (5.7, 10.3)	—	—
PA equivalent	−11.9 (−24.5, 0.7)	−8.5 (−14.7, −2.3)	4.4 (−2.1, 11.0)	8.7 (−3.3, 20.7)	—	—	−1.9 (−5.8, 2.1)	−0.2 (−6.6, 6.2)	1.3 (−12.0, 14.7)
Multicomponent	−7.8 (−15.6, 0.5)	−12.7 (−22.2, −3.2)	20.9 (17.6, 24.2)	−3.6 (−7.7, 0.4)	−32.9 (−39.7, 26.1)	−22.5 (−28.1, −16.9)			

^aAppendix Figures 1–18 provide further details on Forest plots.

PA, physical activity.

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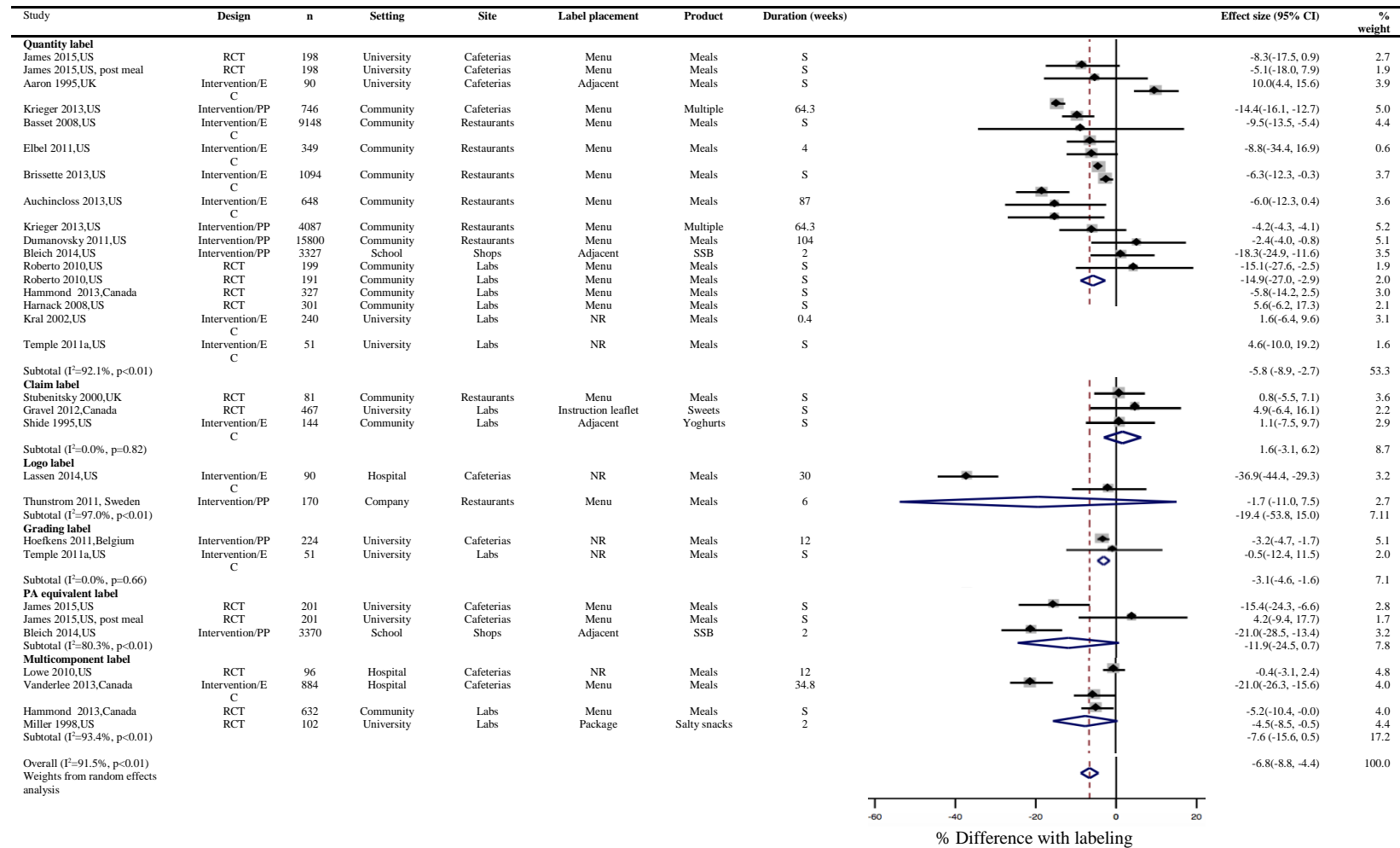
Appendix Figure 1. Effectiveness of food labeling on consumers' dietary behaviors: total calories (stratified by label placement).^a



^aWhen the same study evaluated both sales/purchase data and intake data, we utilized sales/purchase data. Replacing them with intake data did not materially alter the results (Appendix Table 12). Refer to Appendix Table 17 for abbreviations.

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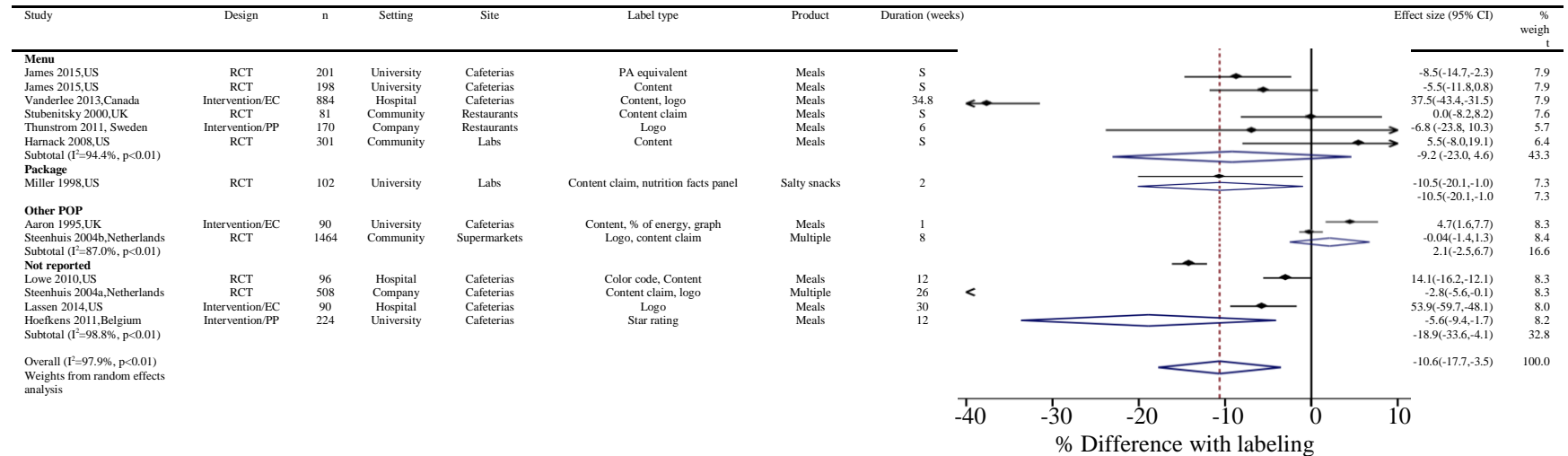
Appendix Figure 2. Effectiveness of food labeling on consumers' dietary behaviors: total calories (stratified by label type).^a



^aWhen the same study evaluated both sales/purchase data and intake data, we utilized sales/purchase data. Replacing them with intake data did not materially alter the results (Appendix Table 12). Refer to Appendix Table 17 for abbreviations.

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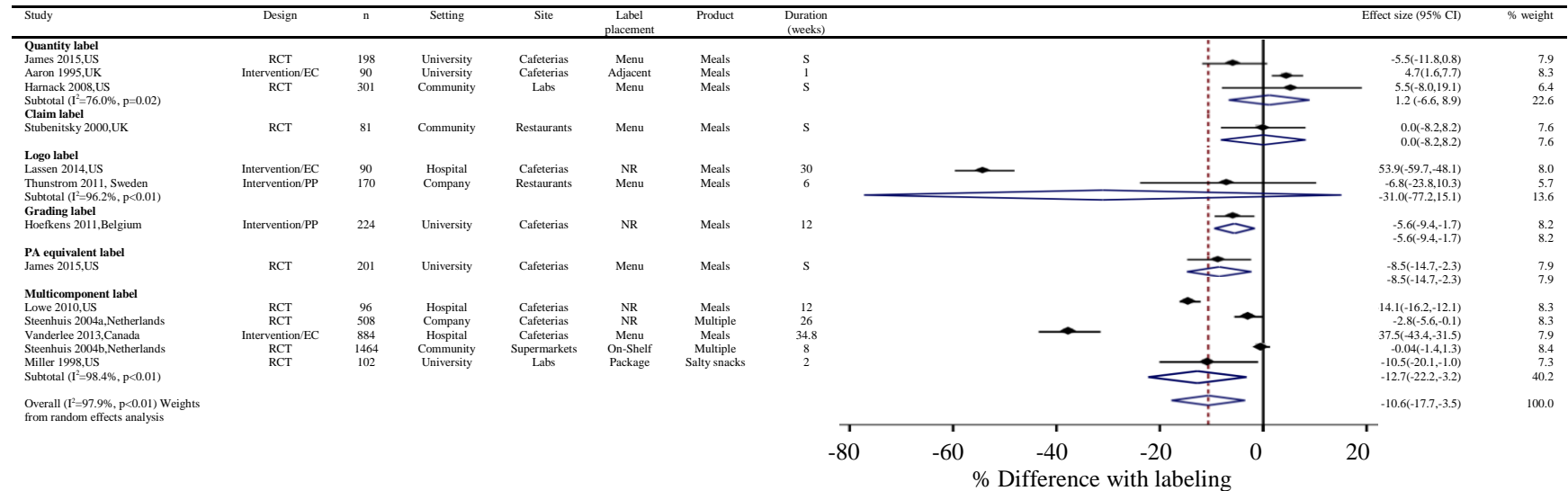
Appendix Figure 3. Effectiveness of food labeling on consumers' dietary behaviors: total fat (stratified by label placement).^a



^aWhen the same study evaluated both sales/purchase data and intake data, we utilized sales/purchase data. Replacing them with intake data did not materially alter the results (Appendix Table 12). Results stratified by consumer intake vs purchases/sales are also available but not shown. Refer to Appendix Table 17 for abbreviations.

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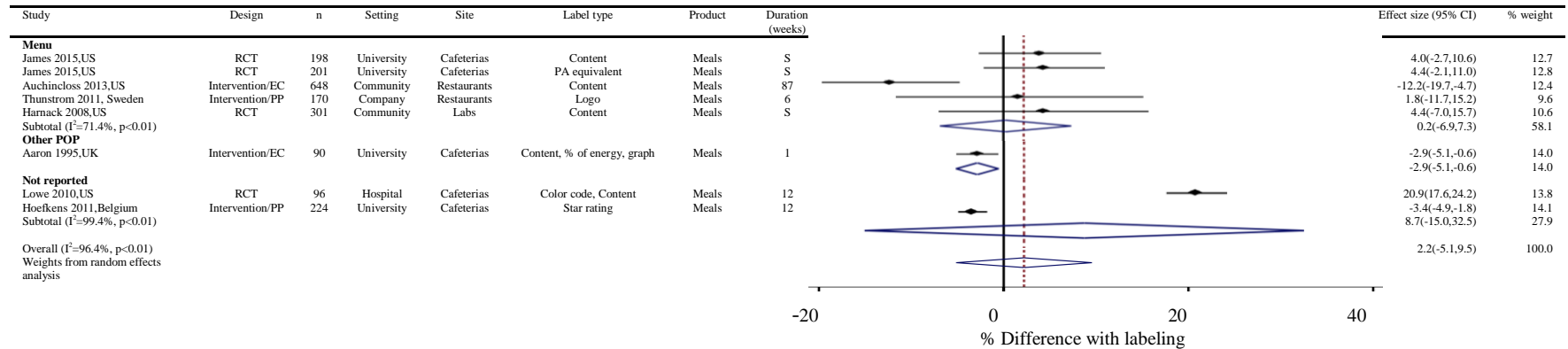
Appendix Figure 4. Effectiveness of food labeling on consumers' dietary behaviors: total fat (stratified by label type).^a



^aWhen the same study evaluated both sales/purchase data and intake data, we utilized sales/purchase data. Replacing them with intake data did not materially alter the results (Appendix Table 12). Refer to Appendix Table 17 for abbreviations.

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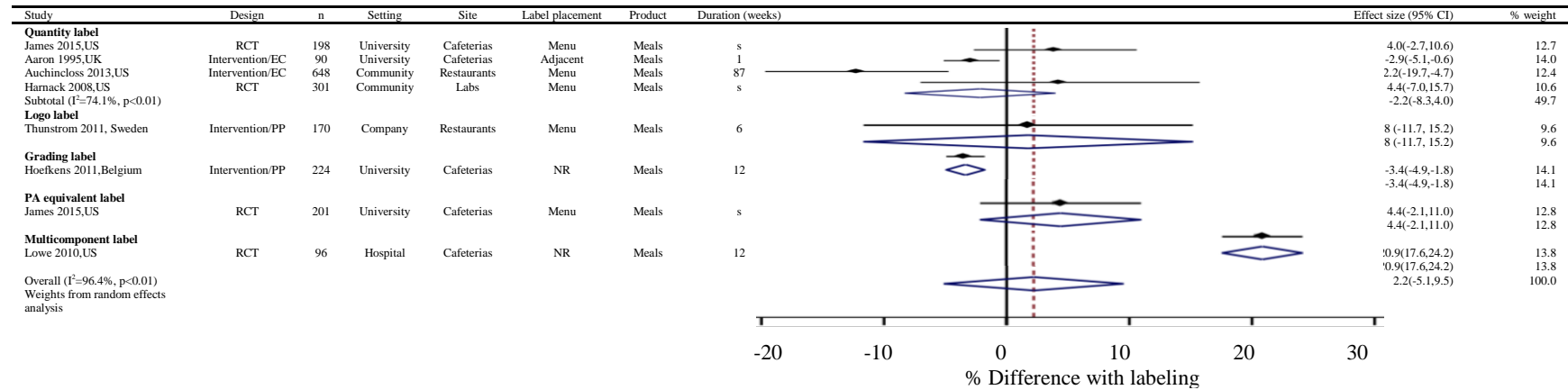
Appendix Figure 5. Effectiveness of food labeling on consumers' dietary behaviors: total carbohydrate (stratified by label placement).^a



^aWhen the same study evaluated both sales/purchase data and intake data, we utilized sales/purchase data. Replacing them with sales data did not materially alter the results (Appendix Table 12). Refer to Appendix Table 17 for abbreviations.

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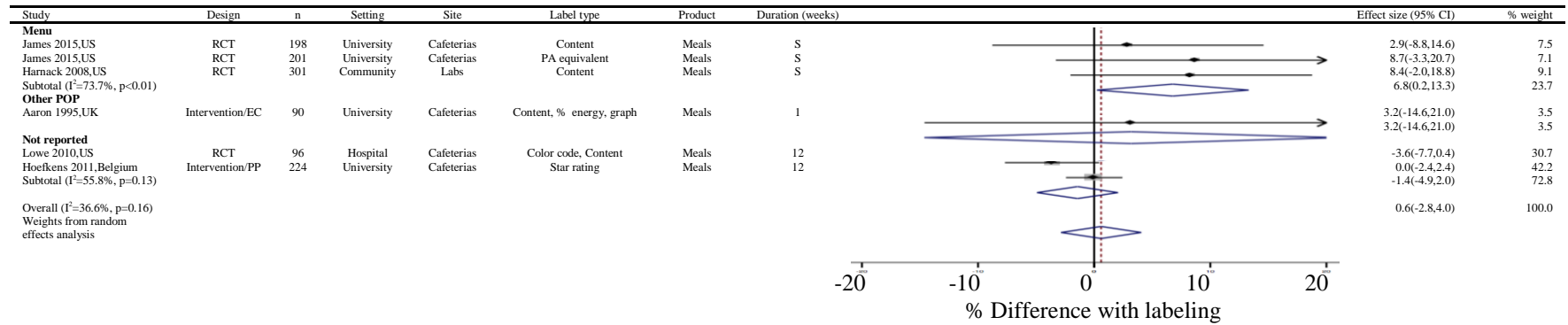
Appendix Figure 6. Effectiveness of food labeling on consumers' dietary behaviors: total carbohydrate (stratified by label type).^a



^aWhen the same study evaluated both sales/purchase data and intake data, we utilized sales/purchase data. Replacing them with sales data did not materially alter the results (Appendix Table 12). Refer to Appendix Table 17 for abbreviations.

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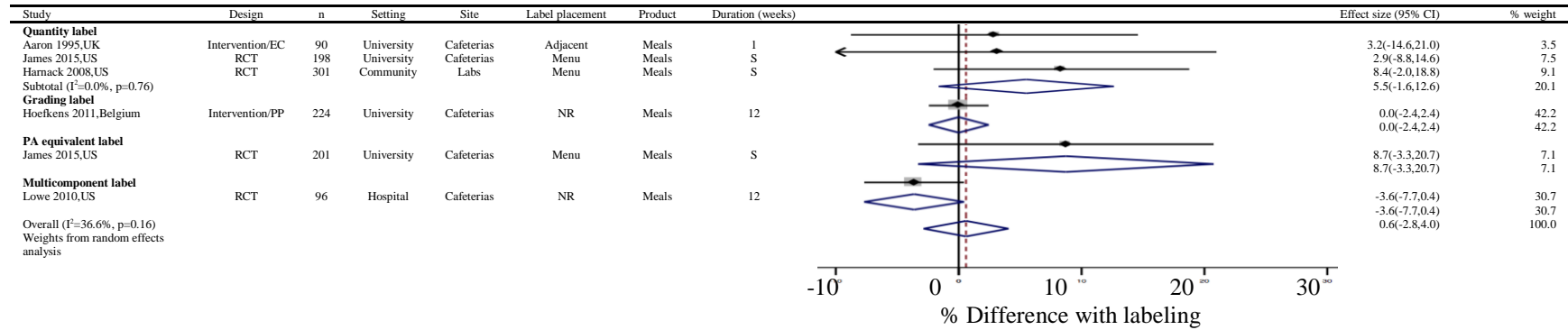
Appendix Figure 7. Effectiveness of food labeling on consumers' dietary behaviors: total protein (stratified by label placement).^a



^aWhen the same study evaluated both sales/purchase data and intake data, we utilized sales/purchase data. Replacing them with sales data did not materially alter the results (Appendix Table 12). Refer to Appendix Table 17 for abbreviations.

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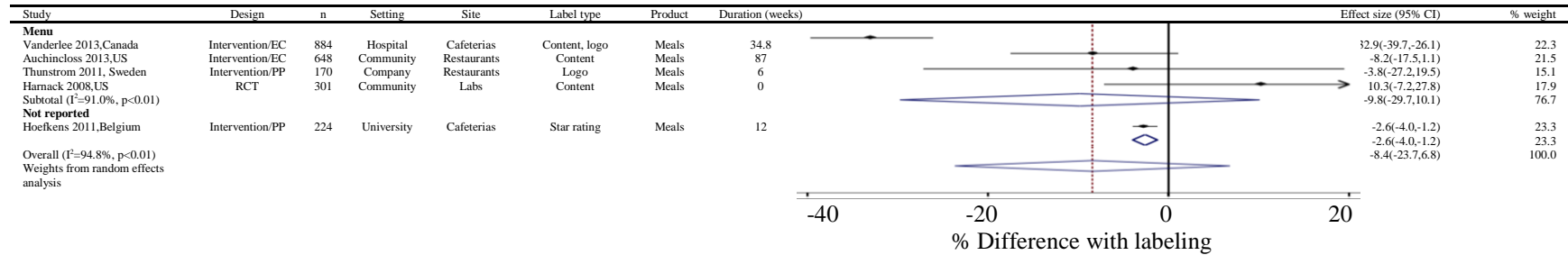
Appendix Figure 8. Effectiveness of food labeling on consumers' dietary behaviors: total protein (stratified by label type).^a



^aWhen the same study evaluated both sales/purchase data and intake data, we utilized sales/purchase data. Replacing them with sales data did not materially alter the results (Appendix Table 12). Refer to Appendix Table 17 for abbreviations.

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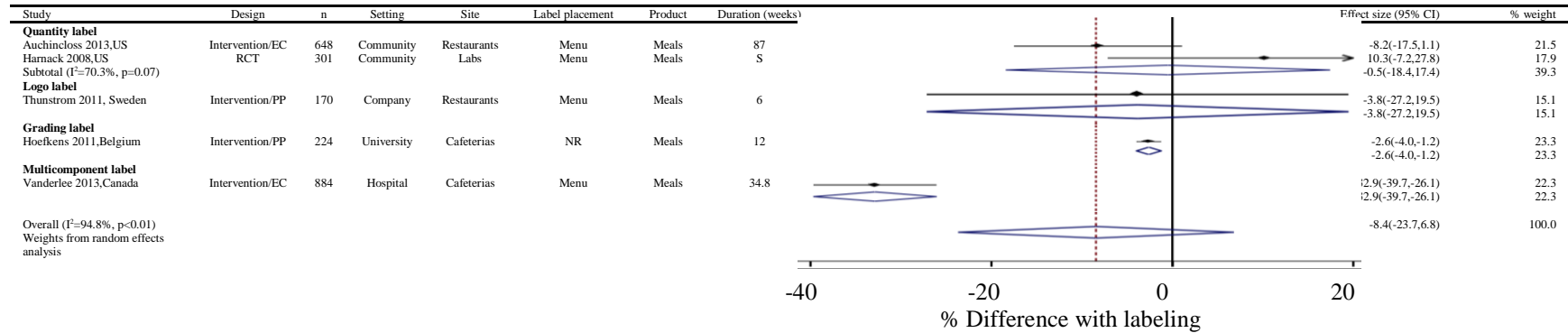
Appendix Figure 9. Effectiveness of food labeling on consumers' dietary behaviors: saturated fat (stratified by label placement).^a



^aWhen the same study evaluated both sales/purchase data and intake data, we utilized sales/purchase data. Replacing them with sales data did not materially alter the results (Appendix Table 12). Refer to Appendix Table 17 for abbreviations.

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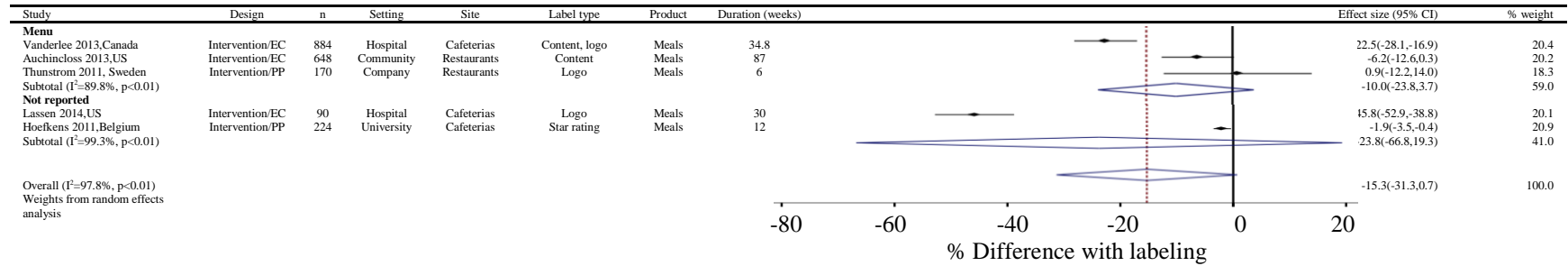
Appendix Figure 10. Effectiveness of food labeling on consumers' dietary behaviors: saturated fat (stratified by label type).^a



^aWhen the same study evaluated both sales/purchase data and intake data, we utilized sales/purchase data. Replacing them with sales data did not materially alter the results (Appendix Table 12). Refer to Appendix Table 17 for abbreviations.

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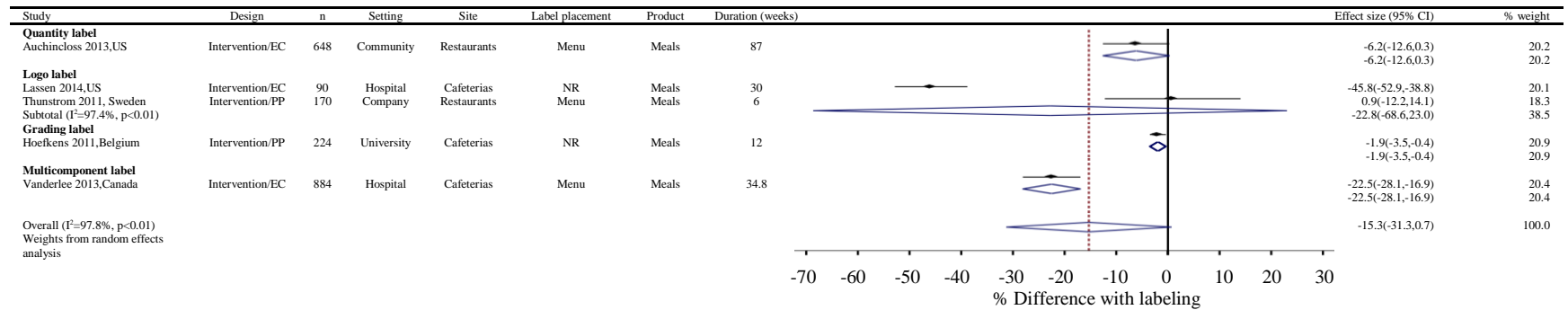
Appendix Figure 11. Effectiveness of food labeling on consumers' dietary behaviors: sodium (stratified by label placement).^a



^aThere is no study evaluating both sodium sales/purchase data and sodium intake data. Refer to Appendix Table 17 for abbreviations.

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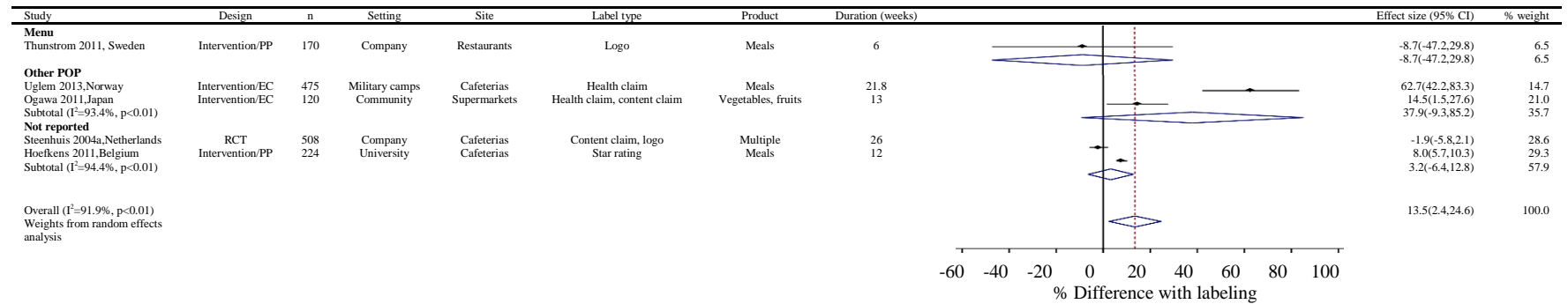
Appendix Figure 12. Effectiveness of food labeling on consumers' dietary behaviors: sodium (stratified by label type).^a



^aThere is no study evaluating both sodium sales/purchase data and sodium intake data. Refer to Appendix Table 17 for abbreviations.

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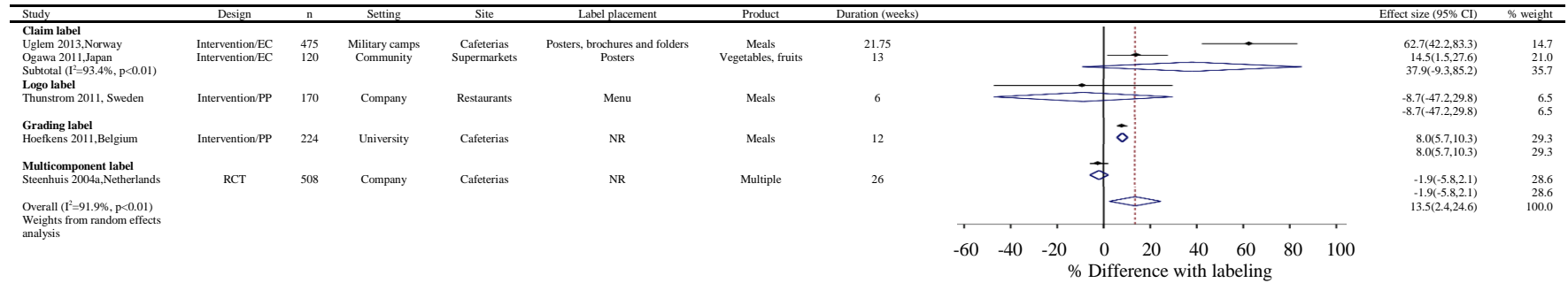
Appendix Figure 13. Effectiveness of food labeling on consumers' dietary behaviors: vegetables (stratified by label placement).^a



^aThere is no study evaluating both vegetables sales/purchase data and vegetables intake data. Refer to Appendix Table 17 for abbreviations.

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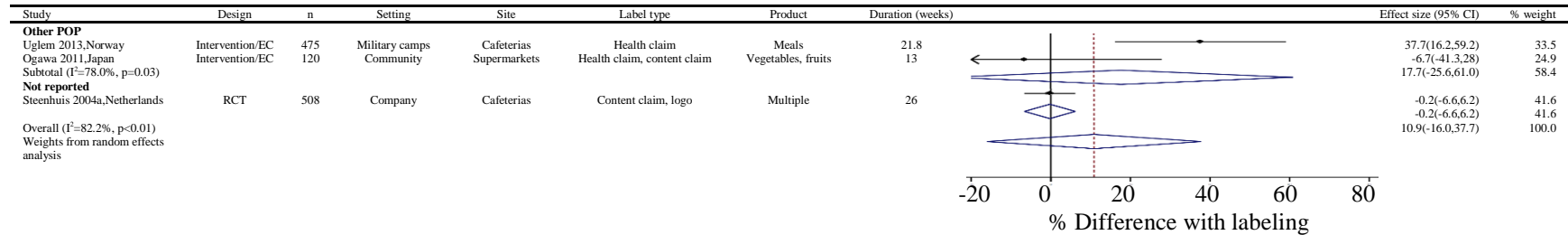
Appendix Figure 14. Effectiveness of food labeling on consumers' dietary behaviors: vegetables (stratified by label type).^a



^aThere is no study evaluating both vegetables sales/purchase data and vegetables intake data. Refer to Appendix Table 17 for abbreviations.

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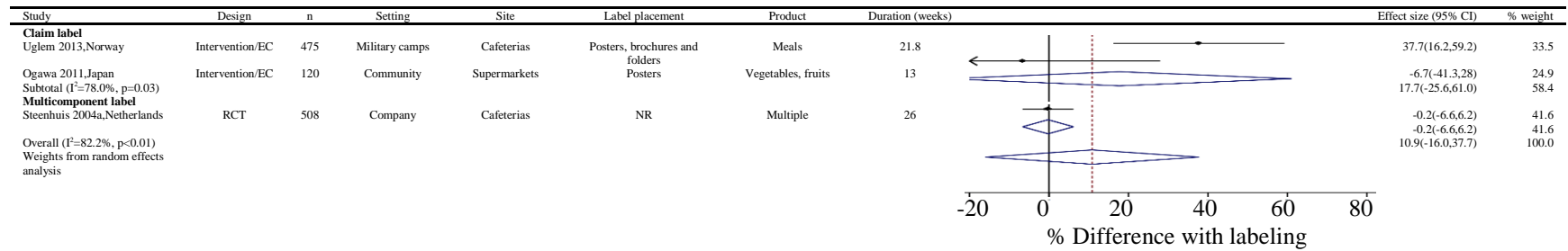
Appendix Figure 15. Effectiveness of food labeling on consumers' dietary behaviors: fruits (stratified by label placement).^a



^aThere is no study evaluating both fruits sales/purchase data and fruits intake data. Refer to Appendix Table 17 for abbreviations.

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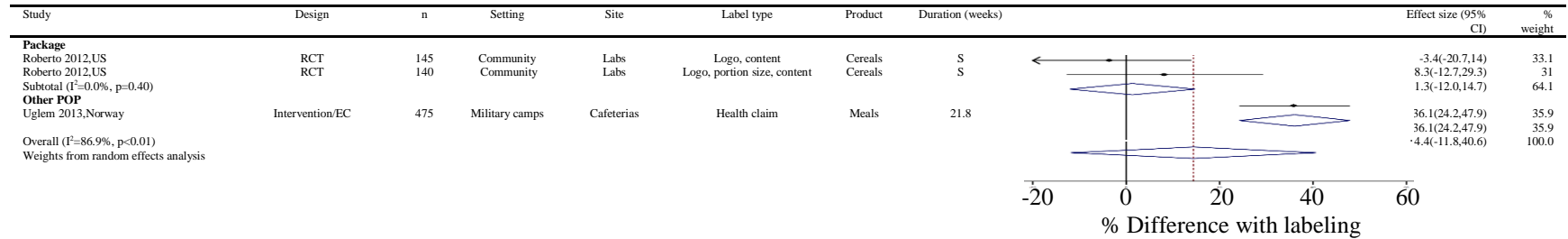
Appendix Figure 16. Effectiveness of food labeling on consumers' dietary behaviors: fruits (stratified by label type).^a



^aThere is no study evaluating both fruits sales/purchase data and fruits intake data. Refer to Appendix Table 17 for abbreviations.

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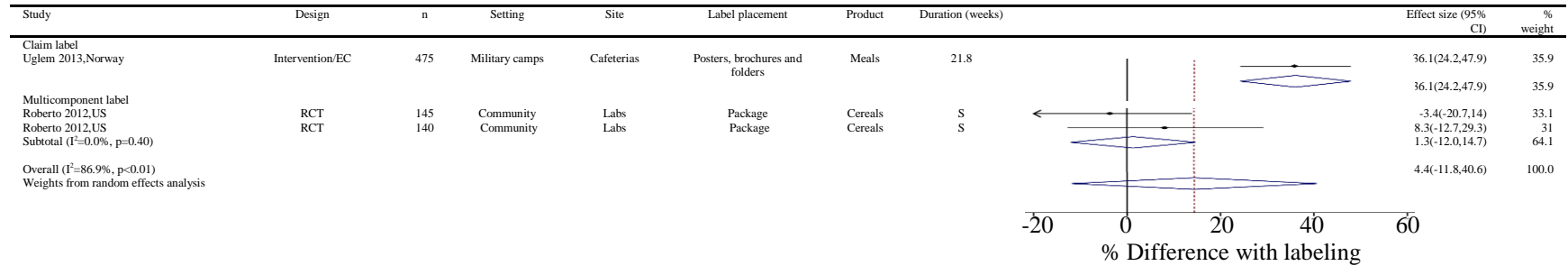
Appendix Figure 17. Effectiveness of food labeling on consumers' dietary behaviors: whole grains (stratified by label placement).^a



^aThere is no study evaluating both whole grains sales/purchase data and whole grains intake data. Refer to Appendix Table 17 for abbreviations.

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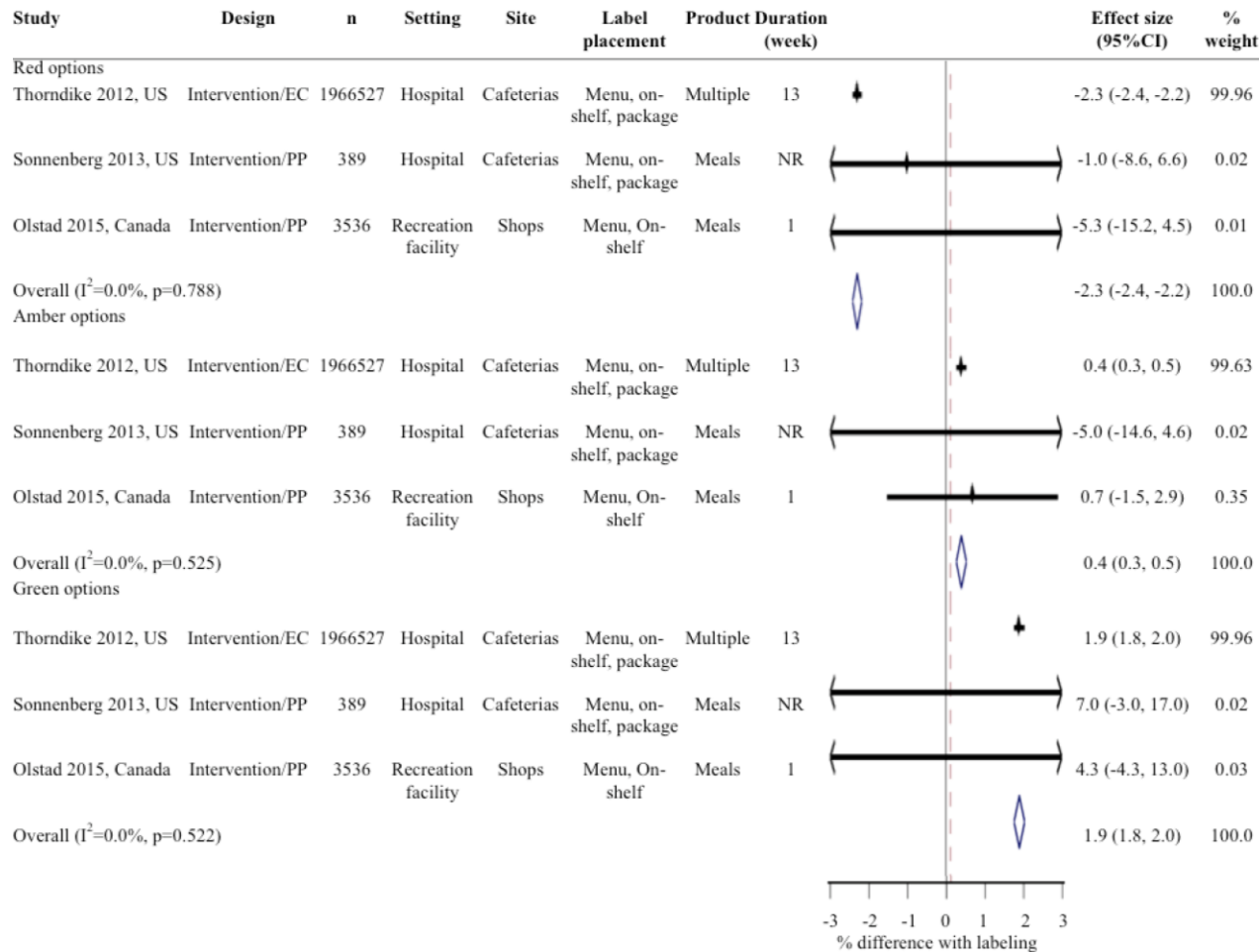
Appendix Figure 18. Effectiveness of food labeling on consumers' dietary behaviors: whole grains (stratified by label type).^a



^aThere is no study evaluating both whole grains sales/purchase data and whole grains intake data. Refer to Appendix Table 17 for abbreviations.

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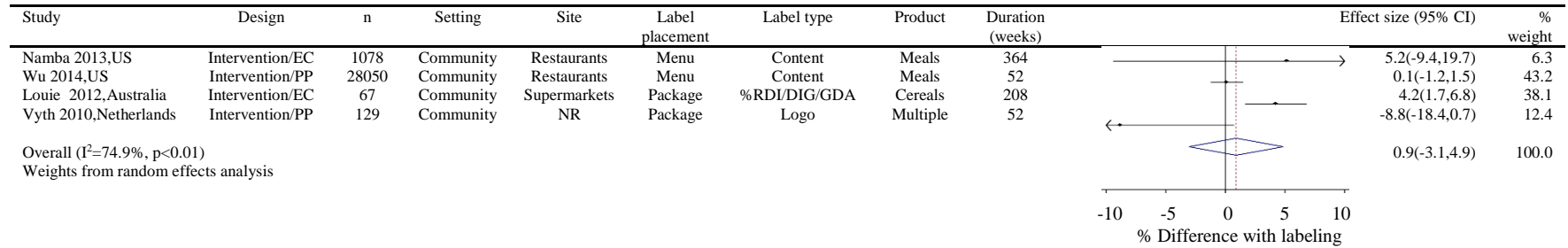
Appendix Figure 19. Effectiveness of traffic light labeling on consumers' dietary behaviors in intervention studies (categorical outcomes).^a



^aThere is no study evaluating both sales/purchase data and intake data for these categorical outcomes. Refer to Appendix Table 17 for abbreviations.

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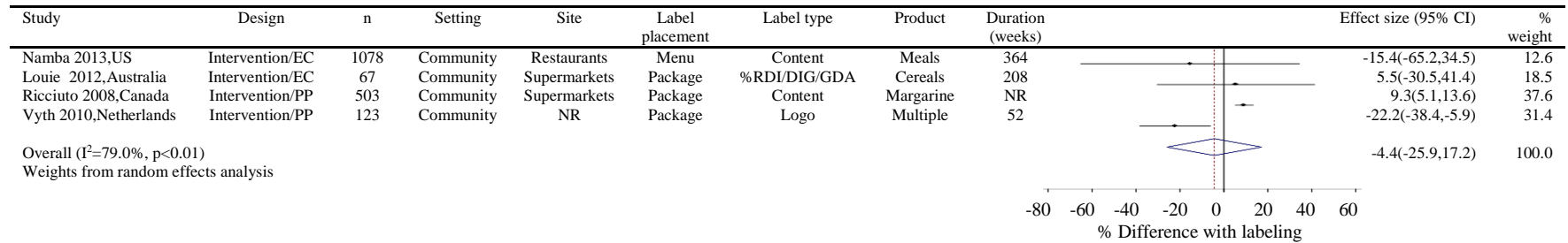
Appendix Figure 20. Effectiveness of food labeling on manufacturers' reformulation in intervention studies: energy content^a



^aRefer to Appendix Table 17 for abbreviations.

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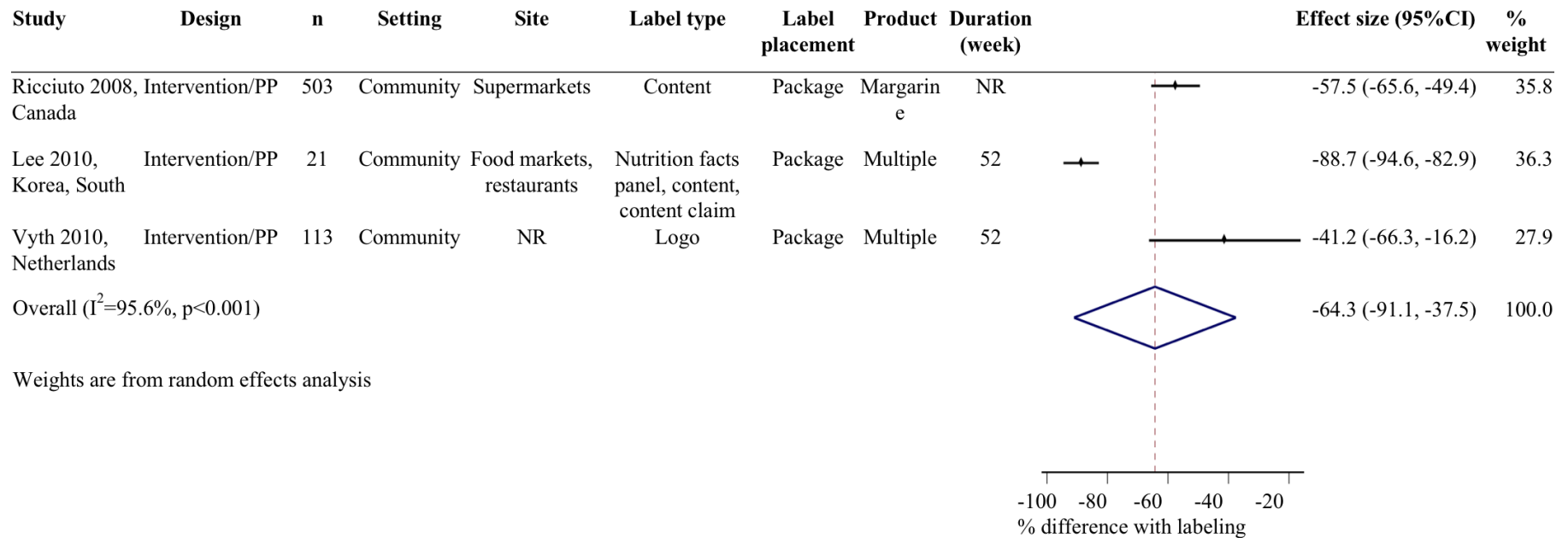
Appendix Figure 21. Effectiveness of food labeling on manufacturers' reformulation in intervention studies: saturated fat content.^a



^aRefer to Appendix Table 17 for abbreviations.

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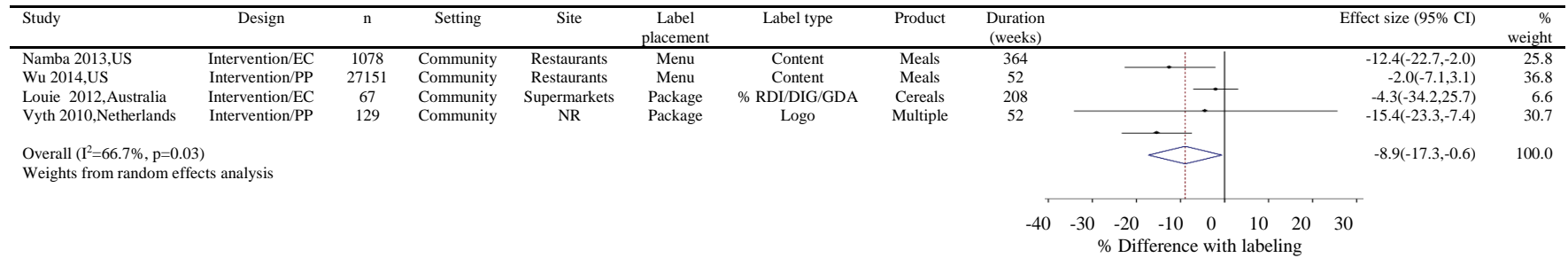
Appendix Figure 22. Effectiveness of food labeling on manufacturers' reformulation in intervention studies: trans fat content.^a



^aRefer to Appendix Table 17 for abbreviations.

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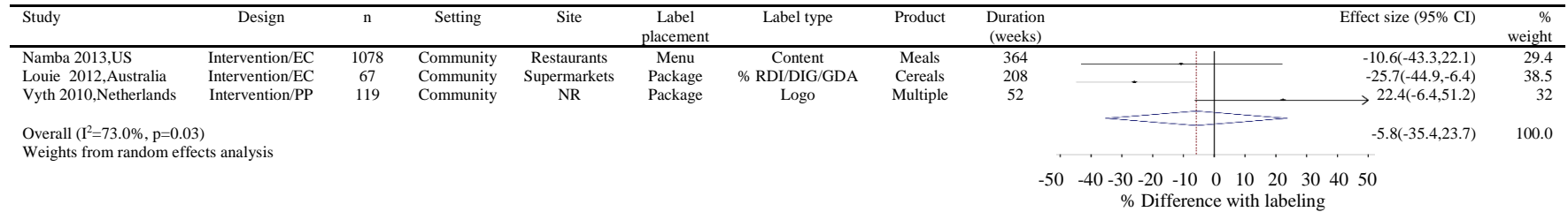
Appendix Figure 23. Effectiveness of food labeling on manufacturers' reformulation in intervention studies: sodium content.^a



^aRefer to Appendix Table 17 for abbreviations.

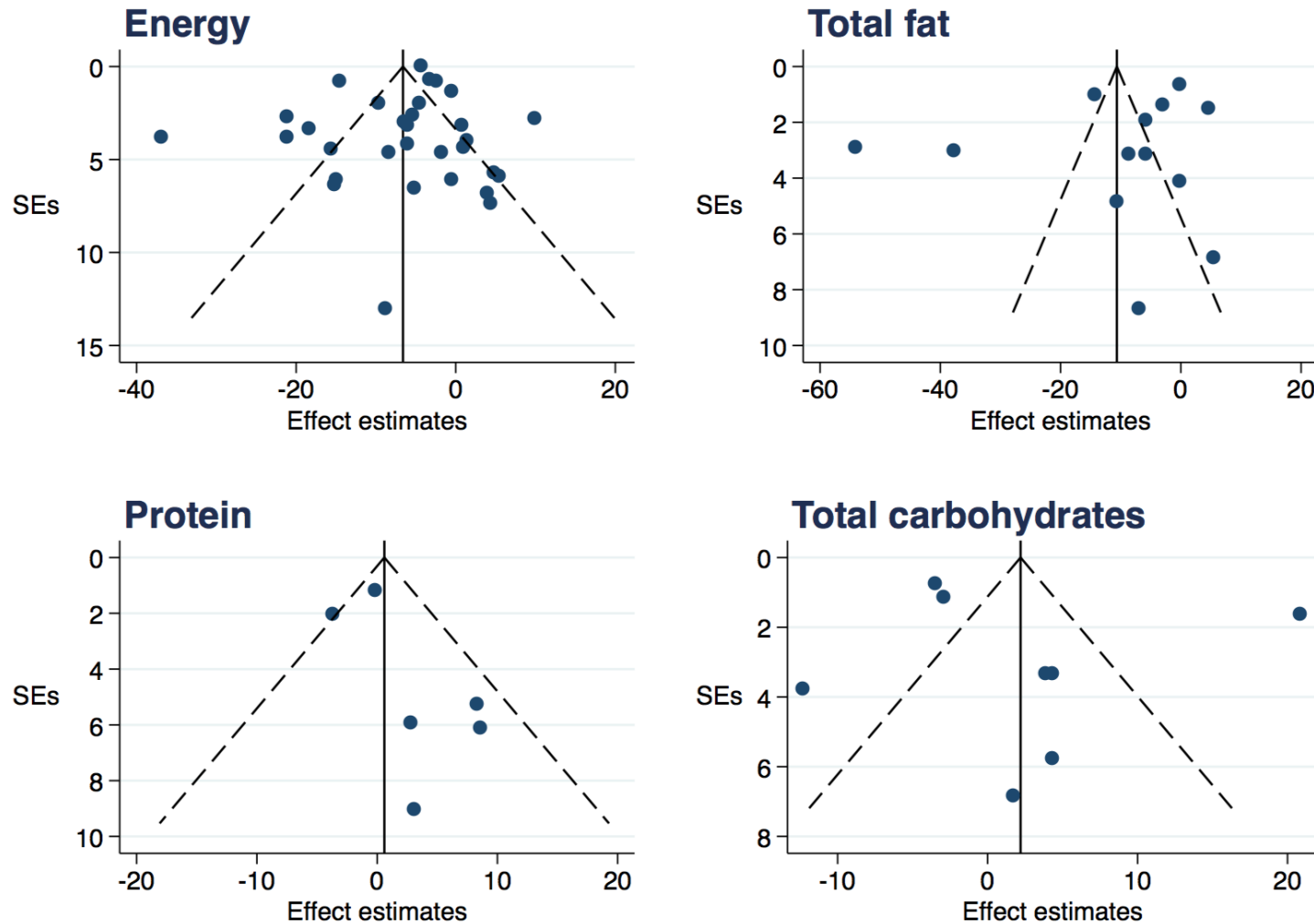
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Appendix Figure 24. Effectiveness of food labeling on manufacturers' reformulation in intervention studies: fiber content^a

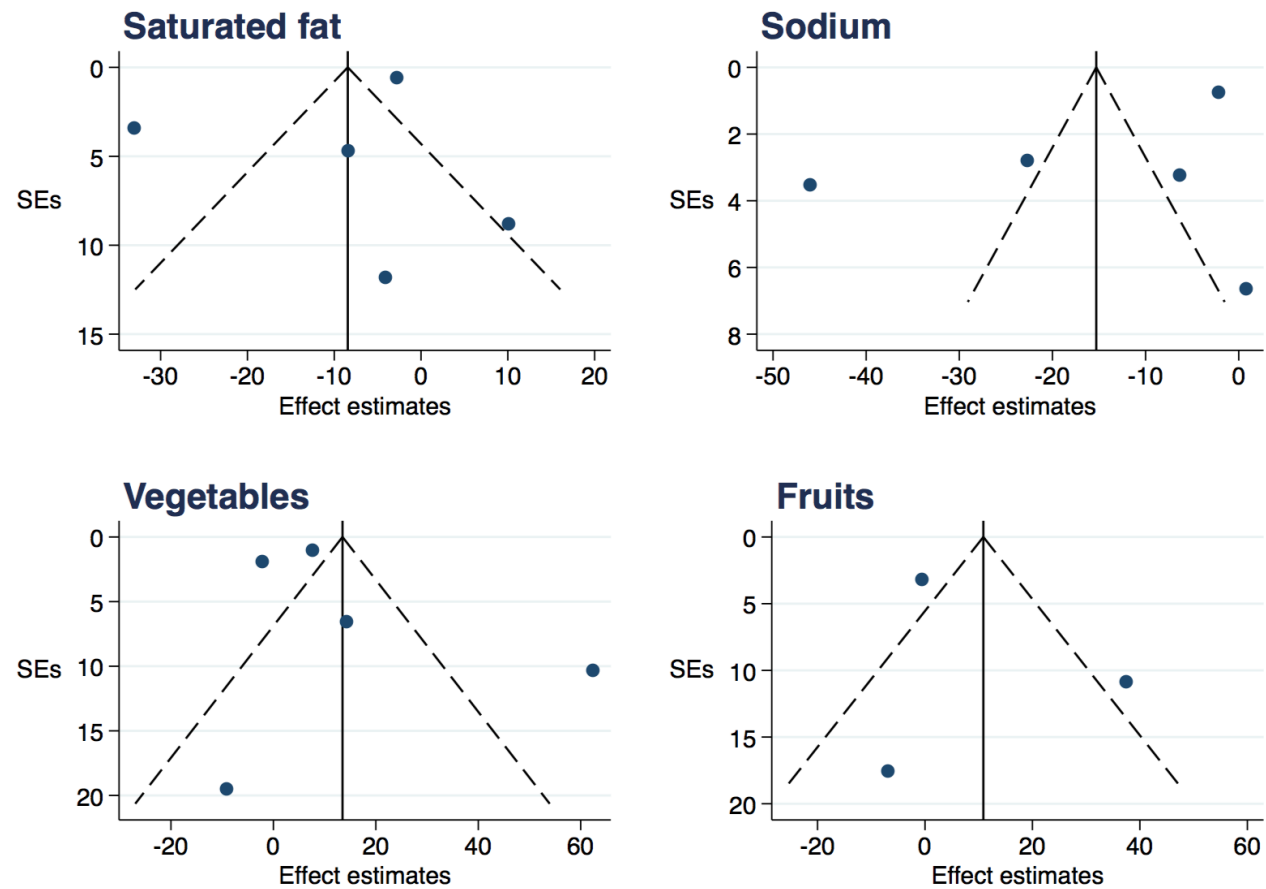


^aRefer to Appendix Table 17 for abbreviations.

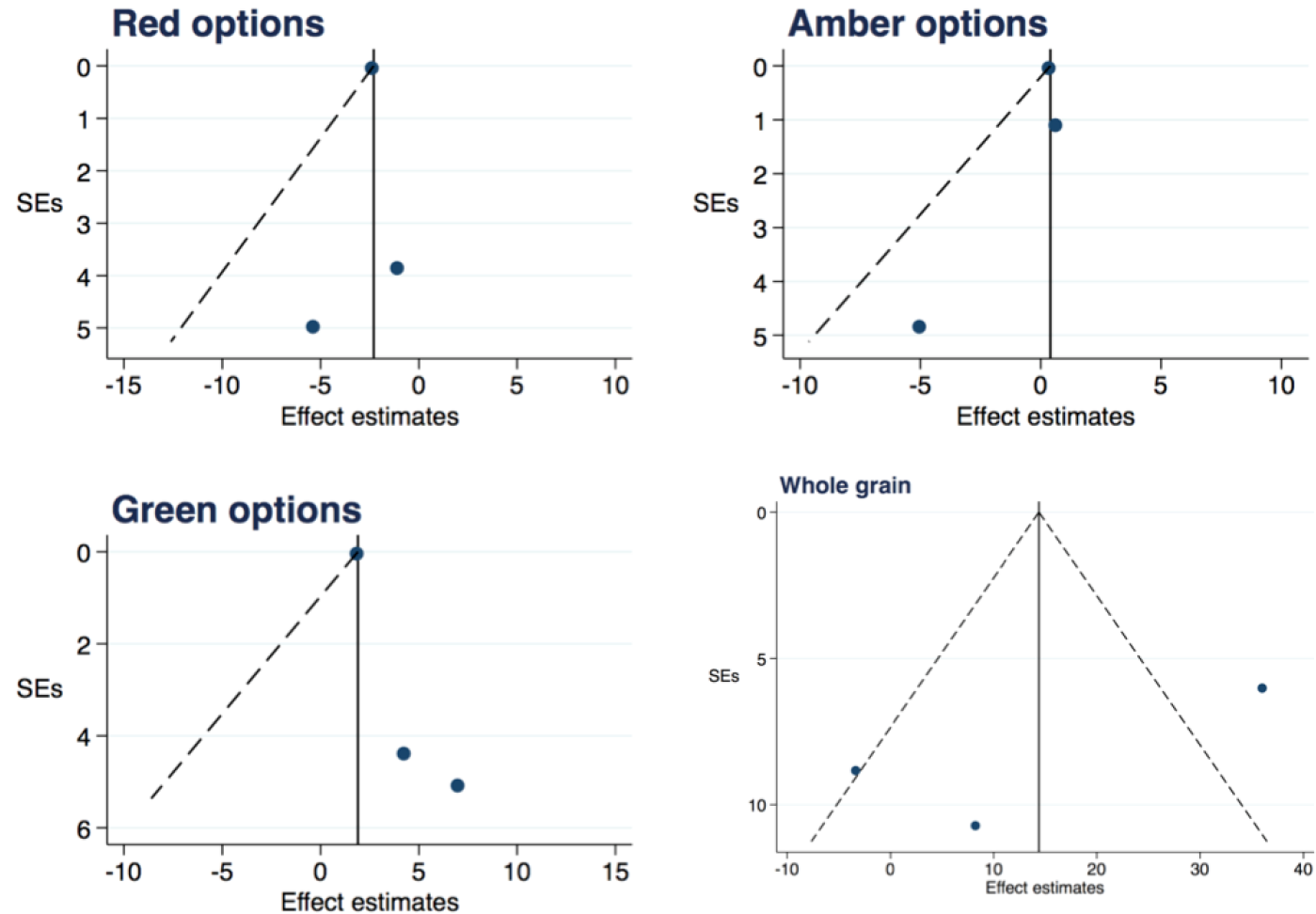
Appendix Figure 25. Begg's funnel plots for graphical evaluation of potential publication bias: dietary behaviors (A).



Appendix Figure 26. Begg's funnel plots for graphical evaluation of potential publication bias – dietary behaviors (B).

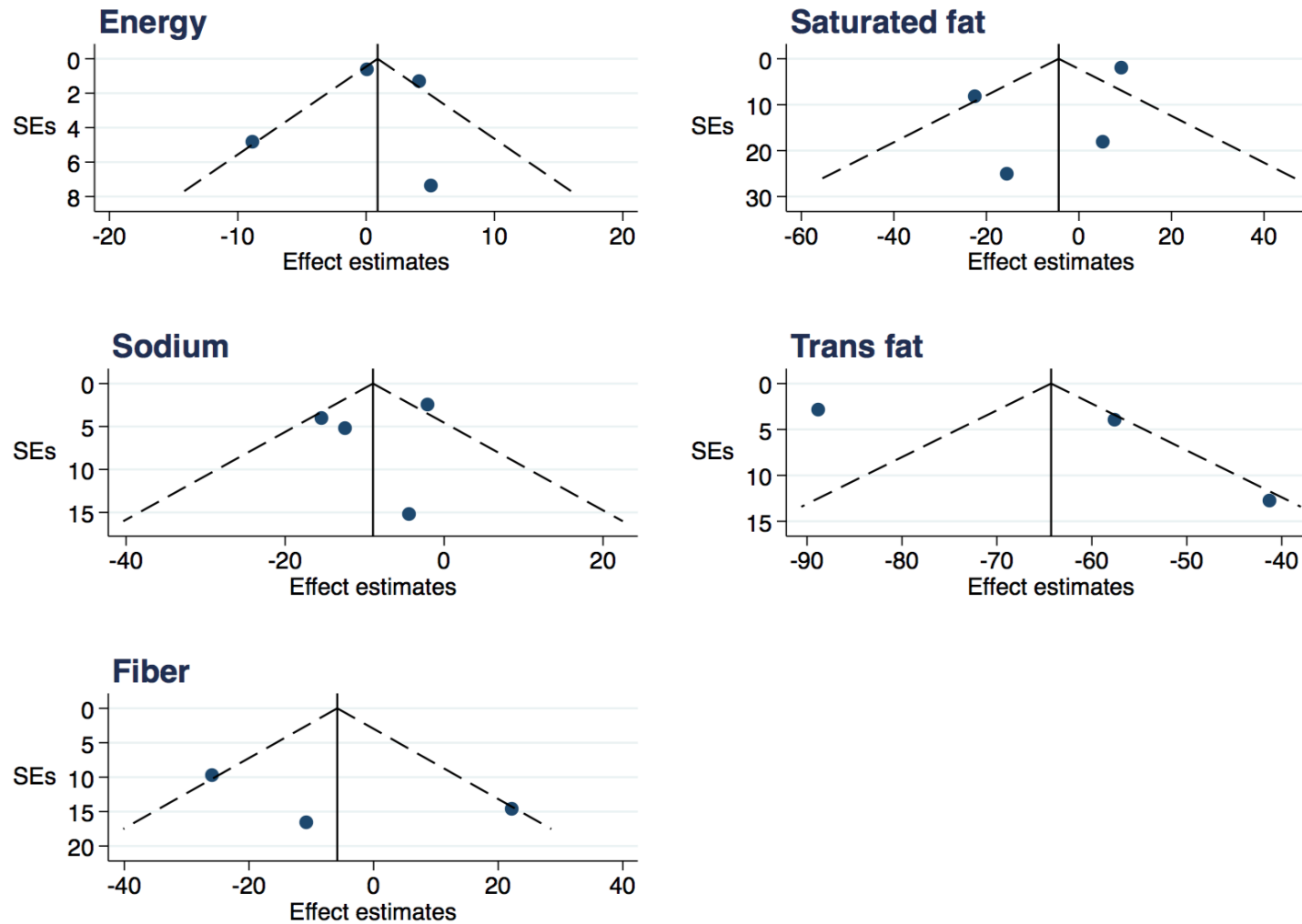


Appendix Figure 27. Begg's funnel plots for graphical evaluation of potential publication bias – dietary behaviors (C).^a



^aRed, amber and green options refers to categorical data; whole grains refers to continuous data

Appendix Figure 28. Begg's funnel plots for graphical evaluation of potential publication bias – reformulation.



Appendix Table 17. Abbreviations in Supplementary Figures

Category	Abbreviation	Full description
Study design	RCT	Randomized controlled trial
	Intervention/EC	Non-randomized intervention trial with an external comparison group
	Intervention/PP	Non-randomized intervention trial with no external comparison group
n	n	Number of people or their purchases based on receipts, orders, etc.
NR	Not reported	Not reported in the article full text
Label type	Content	Absolute content value
	PA equivalent	Physical activity equivalent
	RDI/DIG/GDA	Recommended daily intake/dietary intake guide/guidelines for daily intake
	Graph	Graphic information (bar and pie charts) of the content
Label placement	Adjacent	Labels placed next to the labeled product
	Other POP	Other point of purchases (e.g., leaflet, display, etc.)
Duration	s	Studies conducted in single sessions